PROGRESS REPORTS

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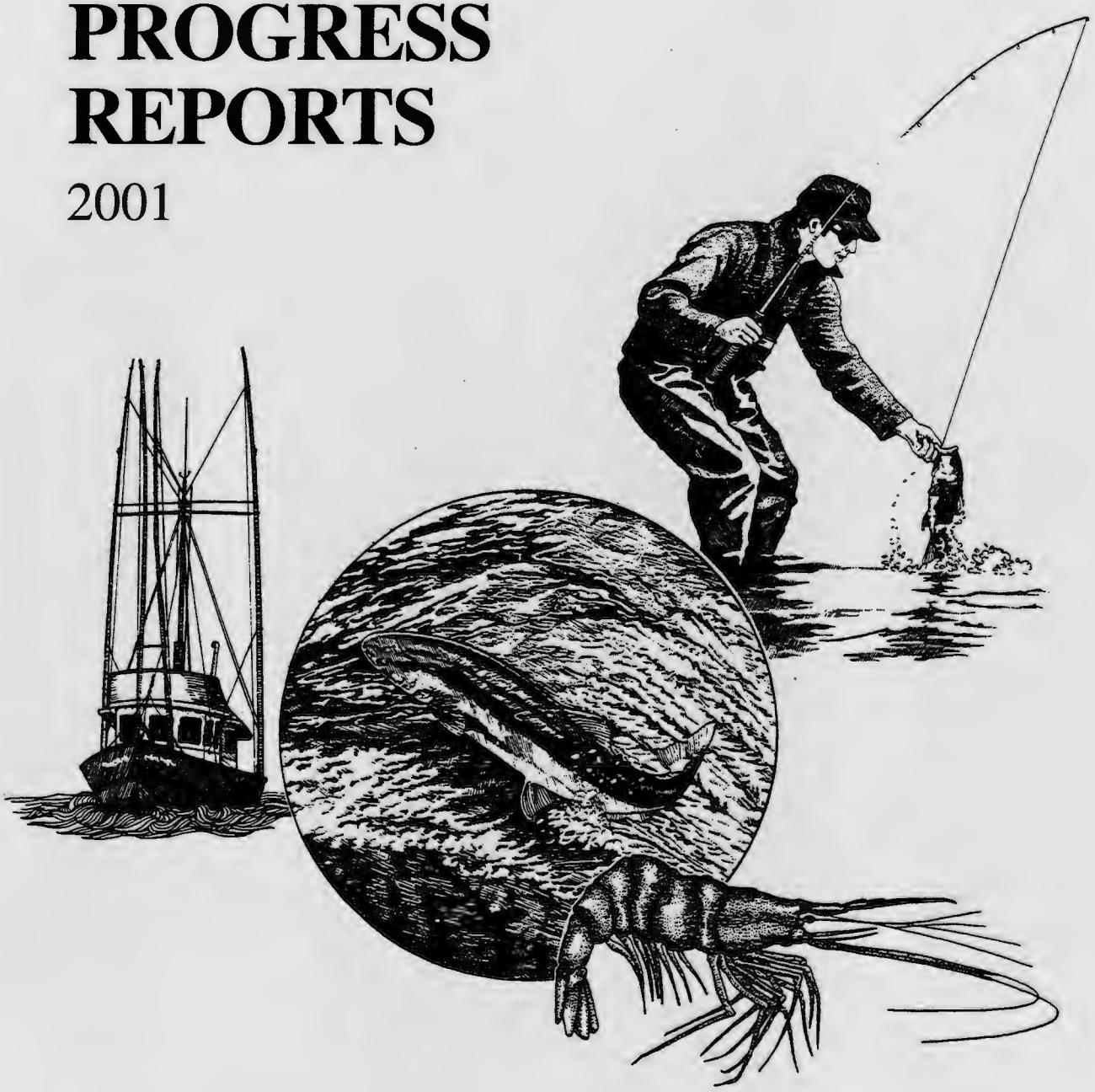

FISH DIVISION

Oregon Department of Fish and Wildlife

Oregon Chub Investigations

ANNUAL PROGRESS REPORT

FISH RESEARCH PROJECT
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CONTENTS

SUMMARY

Populations of Oregon chub *Oregonichthys crameri,* endemic to the Willamette Valley, have been drastically reduced. Factors in the decline of this fish include changes in flow regimes and habitat characteristics resulting from the construction of flood control dams, revetments, channelization, diking, and the drainage of wetlands. The Oregon chub is further threatened by predation and competition by non-native species such as largemouth bass *Micropterus salmoides*, smallmouth bass *M. dolomieui,* crappies *Pomoxis* sp., sunfishes *Lepomis* sp., bullheads *Ameiurus sp.,* and western mosquitofish *Gambusia affinis*. We surveyed in the Willamette River drainage in April-October 2000 to quantify existing Oregon chub populations, search for unknown populations, evaluate potential introduction sites, and monitor introduced populations.

We sampled a total of 77 sites in 2000. We collected Oregon chub for the first time from Barnard Slough in the Middle Fork Willamette drainage. Oregon chub were last collected from this location in 1983 (Bond 1984). Thirty-one of the 77 sites were new sites that were sampled for the first time in 2000. Forty-six sites, sampled in 1991-1999, were revisited. Three sites were sampled twice.

We confirmed the continued existence of Oregon chub at 20 locations. These include naturally occurring populations in the Santiam drainage (Geren Island, Santiam Conservation Easement, Gray Slough, Santiam I-5 backwaters, Pioneer Park backwater, Santiam Public Works Pond), Mid-Willamette drainage (Finley Gray Creek Swamp) and Middle Fork Willamette drainage (Dexter Reservoir Alcoves, East Fork Minnow Creek Pond, Shady Dell Pond, Buckhead Creek, Oakridge Slough, Elijah Bristow State Park, Rattlesnake Creek, and Hospital Pond) and introduced populations in the Middle Fork Willamette (Wicopee Pond, Fall Creek Spillway Ponds), Santiam (Foster Pullout Pond), and Mid-Willamette drainages (Dunn Wetland, Finley Display Pond).

Oregon chub were not found at several locations (Jasper Park Slough, Wallace Slough, East Ferrin Pond, Dexter East Alcove, Hospital Impoundment Pond, Logan Slough, Green's Bridge Backwater, Camas Swale) where they were collected on at least one occasion between 1991-1999 (Scheerer et. al. 1992; 1993; 1994; 1995; 1996; 1998; 1999; 2000; Scheerer and Jones 1997).

Non-native fish were common in off-channel habitats that were surveyed in the Willamette River drainage. Non-native fish were collected from 23 of the 31 new sites sampled in 1999 (74%); no fish were collected at three locations (10%). Western mosquitofish and centrarchids (largemouth bass and bluegill) were the most common non-native fish collected.

Oregon chub were introduced into Menear's Bend Pond in the Santiam River drainage in the October 2000. Additional Oregon chub were introduced into Foster Pullout Pond in October 2000, to supplement the 85 fish introduced in 1999. In the summer of 2000, a habitat enhancement project creating new habitat to benefit Oregon chub was completed in the Long Tom drainage (Mid-Willamette River).

Seven potential Oregon chub reintroduction sites were monitored and evaluated. These included four sites in the Mid-Willamette River drainage (Finley National Wildlife Refuge Beaver and Cattail Ponds, Ankeny National Wildlife Refuge Dunlin-Woodduck Pond, Long Tom Ranch Pond), one site in the Santiam River drainage (Menear's Bend Pond), one site in the McKenzie River drainage (Russell Pond), and one site in the Coast Fork Willamette drainage (Layng Pond).

Estimates of abundance were obtained for naturally occurring populations of Oregon chub in East Fork Minnow Creek Pond, Shady Dell Pond, Elijah Bristow State Park Sloughs,

Hospital Pond, Dexter Reservoir Alcoves, Buckhead Creek, Oakridge Slough, Santiam Conservation Easement Sloughs, Geren Island Ponds, and Finley Gray Creek Swamp. Five of these populations showed an increase in abundance in 2000 (East Fork Minnow Creek Pond, Shady Dell Pond, Middle Buckhead Creek, Dexter Reservoir Alcoves, Finley Gray Creek Swamp). Four populations decreased in abundance (or remain depressed) in 2000 (Geren Island, Santiam Conservation Easement, Elijah Bristow Sloughs, Oakridge Slough) (Table 1).

Abundance estimates for introduced populations of Oregon chub were also obtained. The Oregon chub population in East Ferrin Pond declined from 7,200 fish in 1997 to 0 fish in 2000, and is presumed extinct. The Oregon chub population in the Fall Creek Spillway Pond totaled 5,030 fish in 2000, compared to 6,300 fish in 1999. The Oregon chub population in Wicopee Pond expanded dramatically from ~50 fish in 1999 to 4,580 fish in 2000. The Oregon chub population in the Dunn Wetland Ponds increased from 4,860 fish in 1999 to 14,090 fish in 2000. The Oregon chub population in Finley Display Pond increased from 360 fish in 1999 to 1,750 fish in 2000. Three of the four largest populations in 2000 were introduced populations.

The Middle Fork Willamette River drainage supported the largest number of Oregon chub populations (n=12), followed by the Santiam drainage (n=8), and the Mid-Willamette drainage (n=5). The most abundant Oregon chub populations were found in the Middle Fork Willamette and Mid-Willamette drainages.

The Oregon Chub Recovery Plan (U.S. Fish and Wildlife Service 1998) set a recovery goal for downlisting the species to "threatened" and for delisting the species. The criteria for downlisting the species was to establish and manage ten populations of at least 500 adult fish. All populations must exhibit a stable or increasing trend for five years. At least three populations must be located in each of the three sub-basins (Middle Fork Willamette River, Santiam River, Mid-Willamette River tributaries). In 2000, there were 11 populations totaling 500 or more individuals and six of these populations exhibited a stable or increasing trend for the past five years (Table 1). Five of these six populations were located in the Middle Fork Willamette drainage.

In summary, Oregon chub remain at risk due to their limited distribution compared with their historic geographic range in the Willamette Valley, the loss of suitable habitat and the continued threats posed by the proliferation of non-native fishes, illegal water withdrawals, unauthorized fill and removal operations, and potential chemical spills or careless pesticide applications.

Objectives for 2000-2001

The purpose of this investigation was to determine the status of Oregon chub populations and their habitat in the Willamette River basin, to monitor and evaluate reintroductions of Oregon chub, to introduce Oregon chub into suitable habitats, to locate and evaluate additional reintroduction sites, to protect and enhance Oregon chub habitats, and to evaluate the impacts of activities affecting Oregon chub and their habitats.

Objective 1: Establish new populations at one or two sites. Sites adjacent to Foster Reservoir in the Santiam River drainage, near Cougar Reservoir in the McKenzie River drainage, and at Finley National Wildlife Refuge are leading candidates.

Oregon chub population abundance, status , and trends from 1992-2000. Mark-recapture estimates were obtained at sites where were >40 fish. (Basins: MFW- Middle Fork Willamette, SANT- Santiam, WILL- Mid-Willamette, CFW- Coast Fork Willamette)

	Basin	Year 1992	1993	1994	1995	1996	1997	1998	1999	2000
land Ponds*	WILL							460	4860	14090
Minnow Creek Pond	MFW		8800	7500	7100	4500	4020	4440	4780	5050
Spillway Ponds*	MFW						475	1400	6300	5030
Pond*	MFW	3			0	1	9	25	16	4580
l Pond	MFW		1600	4800	3800	4200	3790	3650	2860	3830
ckhead Creek	MFW								3010	3570
ond	MFW		690		780		3160	3030	3020	2980
tow State Park Sloughs	MFW		4000		1900		2010	5350	3780	2360
servoir Alcoves	MFW	780			140	40	2250	1280	1180	2320
play Pond*	WILL								360	1750
y Creek Swamp	WILL		600	460	470	520	620	620	510	730
nd	SANT					8340	8700	1830	860	360
Slough	MFW			4	8		2	21	480	140
lout Pond*	SANT									80
5 Backwaters	SANT						5	2	3	13
Conservation Easement	SANT			1250		830	300	250	13	4
gh	SANT				2	3	2	0	13	4
Creek Enhancement Ponds**	MFW								4	4
Slough	MFW	0								3
ke Creek	MFW	7			6				1	2
ark Backwater	SANT						2	0	0	2
ublic Works Pond	SANT							3	4	1
y Creek	WILL			26			2		denied	access
Creek	WILL		5			5			denied	access
ridge	SANT		5			2	5	0	2	0
mpoundment Pond**	MFW				6	0	1	0	1	0
ugh	SANT						2			0
vale	CFW	1	2	0		0			0	0
n Pond*	MFW				3500	5600	7200	3500	60	0
lough	MFW						3	0	0	0
st Alcove	MFW	40				0	0	0		0
rk Slough	MFW			3		0		0	0	0

duction site
enhancement project

Objective 2: Evaluate sites for future Oregon chub reintroductions. Monitor temperature regimes. Evaluate quantity and quality of aquatic vegetation. Determine the presence of non-native species. Determine site stability (includes vulnerability to drying, spills, introductions of non-native species, other?). Determine site ownership and make landowner contacts.

Objective 3: Determine the status and estimate the population size of Oregon chub populations.

Task 3.1: Obtain population estimates of Oregon chub and other fish species in the Middle Fork Willamette drainage (East Fork Minnow Creek Pond, Elijah Bristow State Park Sloughs, Shady Dell Pond, Dexter Reservoir Alcoves), Santiam drainage (Geren Island, Santiam Conservation Easement Sloughs), and Mid-Willamette drainage (Finley Gray Creek Swamp).

Task 3.2 Monitor Oregon chub introductions and habitat enhancement projects in the Middle Fork Willamette drainage (Fall Creek Spillway Ponds, Wicopee Pond, East Ferrin Pond), Santiam drainage (Foster Pullout Pond, Geren Island), and Mid-Willamette drainage (Dunn Wetland Ponds, Finley National Wildlife Refuge Cattail and Display Ponds, Ankeny National Wildlife Refuge, Long Tom Ranch).

Task 3.3 Determine the status (confirm presence) of small populations of Oregon chub in the Santiam drainage (Gray Slough, Public Works Pond, I-5 Backwaters, Green's Bridge, Logan Slough) and Middle Fork Willamette drainage (Rattlesnake Creek).

Objective 4: Investigate sites (off-channel habitats) for the presence of previously unknown Oregon chub populations in the Willamette River basin (Santiam, Middle Fork Willamette, and mainstem Willamette River off-channel habitats). Describe the habitat characteristics and fish communities at these locations.

Objective 5: Evaluate the impacts of activities (currently unknown) that affect Oregon chub and their habitats in the Willamette River drainage.

Accomplishments in 2000-2001

Objective 1 was accomplished. Oregon chub were introduced into Menear's' Bend and Foster Pullout Pond in the Santiam River drainage. Objective 2 was accomplished. Objective 3 was accomplished. Additional population estimates were made in Oakridge Slough, Buckhead Creek, and Hospital Pond in the Middle Fork Willamette River drainage. The status of small populations was determined at additional sites in the Middle Fork Willamette drainage (Wallace Slough, Dexter West Alcove, Jasper Park Slough). Objective 4 was accomplished. Several activities affecting Oregon chub populations or habitat (Objective 5) were monitored in 2000. These activities include bridge replacement on Highway 58, potential expansion of a gravel mining operation, replacement of an irrigation dam on the Long Tom River, impacts of land application of biosolids near Oakridge Slough, and a diesel spill at Geren Island.

Findings in 2000-2001

1. In 2000, we sampled 77 sites in the Willamette Valley. Oregon chub were collected from 21 locations where they were collected in prior years. Oregon chub were not found at eight locations where they had been collected on one or more occasions between 1991-1999 (only small numbers of Oregon chub were collected at seven of these sites between 1991-1999).

2. Oregon chub population estimates were obtained at Dunn Wetland Ponds (n=14,090), East Fork Minnow Creek Pond (n=5,050), Fall Creek Spillway Ponds (n=5,030), Wicopee Pond (n=4,580), Shady Dell Pond (n=3,830), Middle Buckhead Creek (n=3,570), Hospital Pond (n=2,980), Elijah Bristow State Park Sloughs (n=2,360), Dexter Reservoir Alcoves (n=2,320), Finley Gray Creek Swamp (n=730) and Display Pond (n=1,750), Geren Island Ponds (n=360), Oakridge Slough (n=140), Foster Pullout Pond (n=80), and Santiam Conservation Easement Sloughs (n=4 captured).

3. A habitat enhancement project was completed in the Long Tom River drainage in 2000. This project created habitat suitable for Oregon chub and will be monitored as a potential introduction site.

4. Oregon chub were introduced into a new location in the Santiam River drainage (Menear's Bend). Additional Oregon chub were introduced to supplement the population introduced in 1999 in Foster Pullout Pond in the South Santiam drainage.

5. Oregon chub were generally absent from suitable habitat where non-native fishes were collected. Of the sites visited for the first time in 2000, non-native fish were collected from 74% of the sites. Several locations with declining Oregon chub populations (Geren Island, Santiam Conservation Easement Sloughs, East Ferrin Pond) showed an increase in the numbers of, or were recently invaded by, non-native fish. Non-native fish were absent from those locations that supported the seven most abundant chub populations.

6. Oregon chub were found inhabiting silted, shallow pools containing an abundance of aquatic vegetation and off-channel ponds that have little or no water velocity. The fish were often associated with beaver ponds.

7. Seven locations were evaluated for the potential reintroduction of Oregon chub in the Willamette Valley. Evaluations included fish sampling, monitoring of temperature regimes and water levels, and quantification / classification of the aquatic vegetation.

8. Oregon chub remain at risk due to the loss of suitable habitat, continued threats to existing populations, and continued proliferation of non-native fish in suitable habitats.

INTRODUCTION

Oregon chub are endemic to the Willamette River drainage of western Oregon (Markle et al. 1991). This species was formerly distributed throughout the Willamette River Valley (Snyder 1908) in off-channel habitats such as beaver ponds, oxbows, stable backwater sloughs, and flooded marshes (Figure 1). These habitats usually have little or no water flow, have silty and organic substrate, and have considerable aquatic vegetation and cover for hiding and spawning. In the last 100 years, these habitats have disappeared because of changes in seasonal flows resulting from the construction of dams throughout the basin, channelization of the Willamette River and its tributaries, and agricultural practices. This loss of habitat combined with the introduction of non-native species to the Willamette Valley resulted in a sharp decline in Oregon chub abundance.

The reduction of habitat and the restricted distribution of the Oregon chub resulted in a determination of "endangered" status under the federal endangered species act (Markle and Pearsons 1990; Rhew 1993). To evaluate Oregon chub population abundance and distribution, the Oregon Department of Fish and Wildlife conducted surveys in April - October 2000. Similar surveys were conducted in 1991-1999. The objectives of the surveys were to collect information on the status, distribution, and abundance of Oregon chub, the presence of non-native and native species, the characteristics of historic Oregon chub habitats, the characteristics of potential reintroduction sites, and to evaluate Oregon chub reintroductions. In addition, evaluation and reviews of projects or activities with potential impacts on Oregon chub and their habitat were provided to the U.S. Fish and Wildlife Service.

METHODS

Surveys were conducted at locations throughout the Willamette Valley (Figures 2-3). Sampling was conducted using a 1 m x 5 m seine with 64 mm mesh. When seining was impractical due to water depth or impenetrable aquatic vegetation, fish were collected using dip nets, experimental gill nets, baited minnow traps, and/or by snorkeling. We sampled approximately 20% of the surface area of each site and counted and measured all Oregon chub collected. Other fish species were identified, counted, and their length recorded in 25-millimeter increment categories. The presence of amphibian and reptile species and their life stages was recorded.

Physical and biological habitat parameters recorded at each site included substrate, aquatic vegetation, depth, temperature, and total surface area. Each new site was photographed when sampled. A unique map code was assigned to each site. Map codes begin with several capital letters followed by a number. For example, the first site sampled at a location was given the code "*XXX*1", the second site visited at that location was given the code "*XXX*2", and so on. If site "*XXX*1" was revisited, the first time it was revisited the capital letter "A" was added to the map code (i.e. *XXX*1A). If the site was revisited the following year the capital letter "B" replaced the "A" (i.e. *XXX*1B), and so on. To distinguish sites sampled in the fall from those sampled in the spring, we added an asterisk (*) to the end of the sites sampled in the fall. We made this distinction because of differences in habitat conditions (water temperature, pond area, vegetation, depth, etc.) that occur as water levels receded during the summer months. Hence, if site "*XXX*1B" was revisited in May of the following year it was assigned a map code "*XXX*1C". If the site was revisited in September, rather than May, the asterisk was added and the map code was "*XXX*1C*".

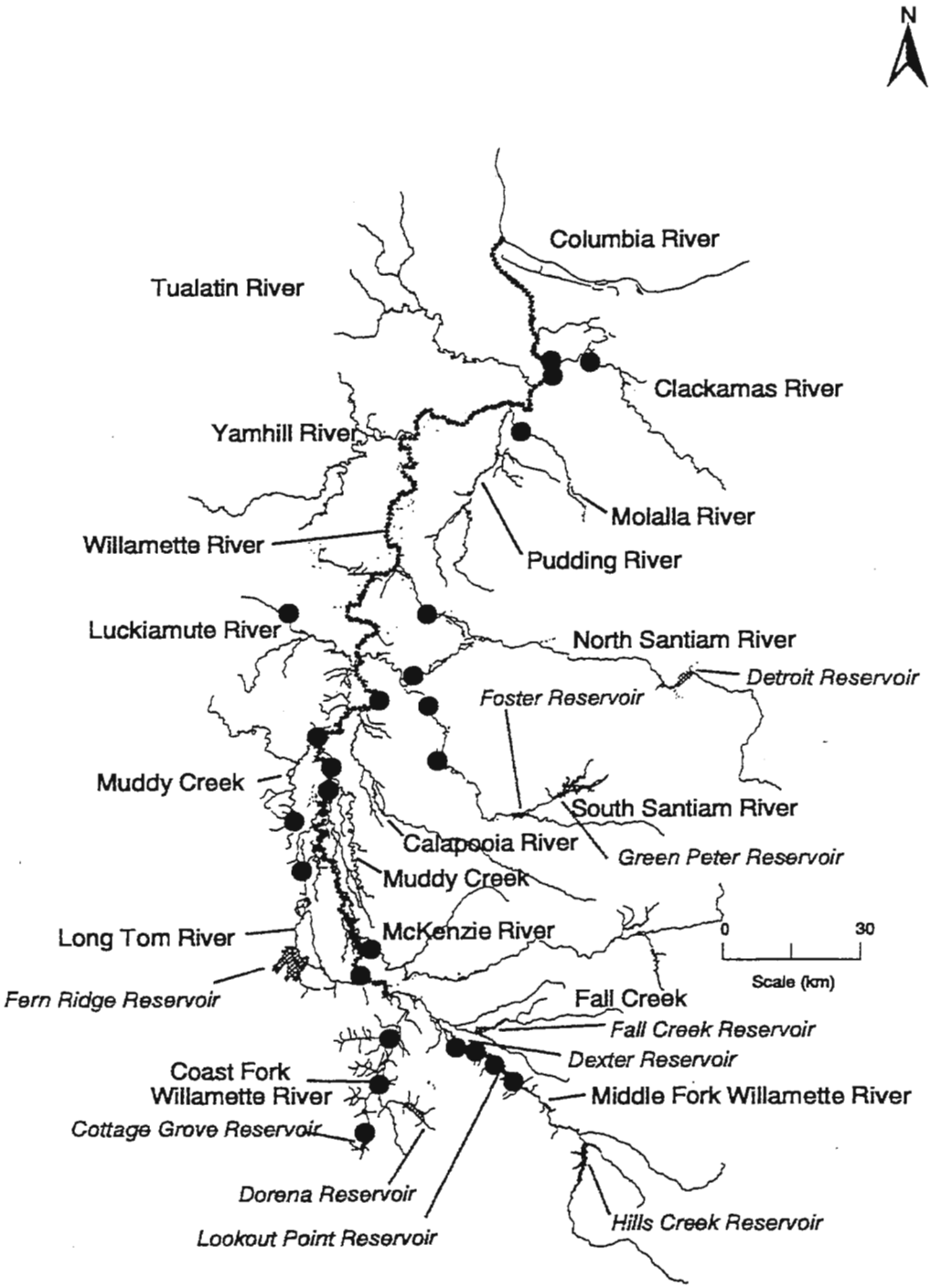


Figure 1. Historical range of Oregon chub in the Willamette Valley, Oregon (adapted from Markle et. al. 1991).

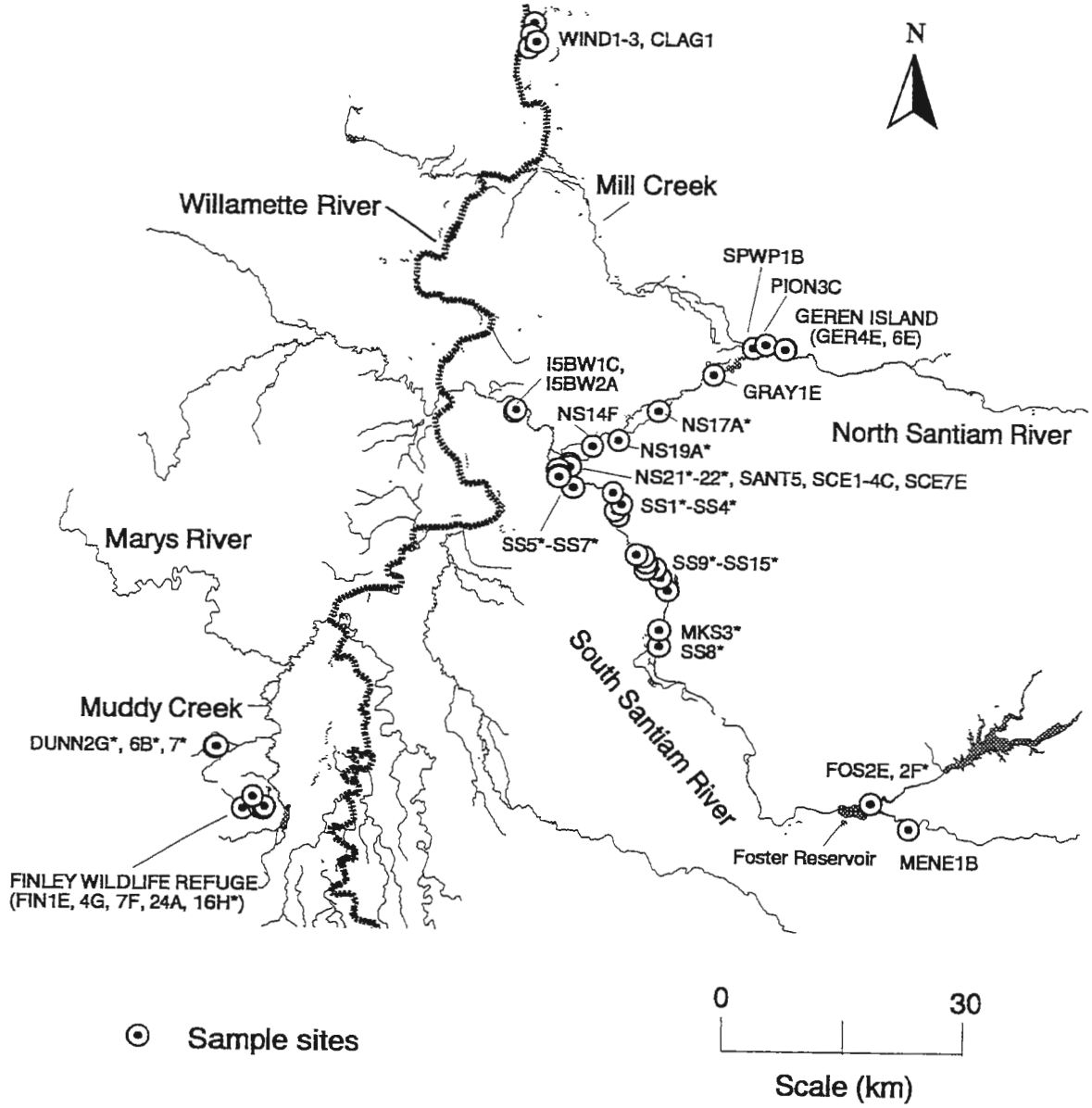


Figure 2. Survey locations for Oregon chub in the Santiam and Mid-Willamette River drainages in 2000.

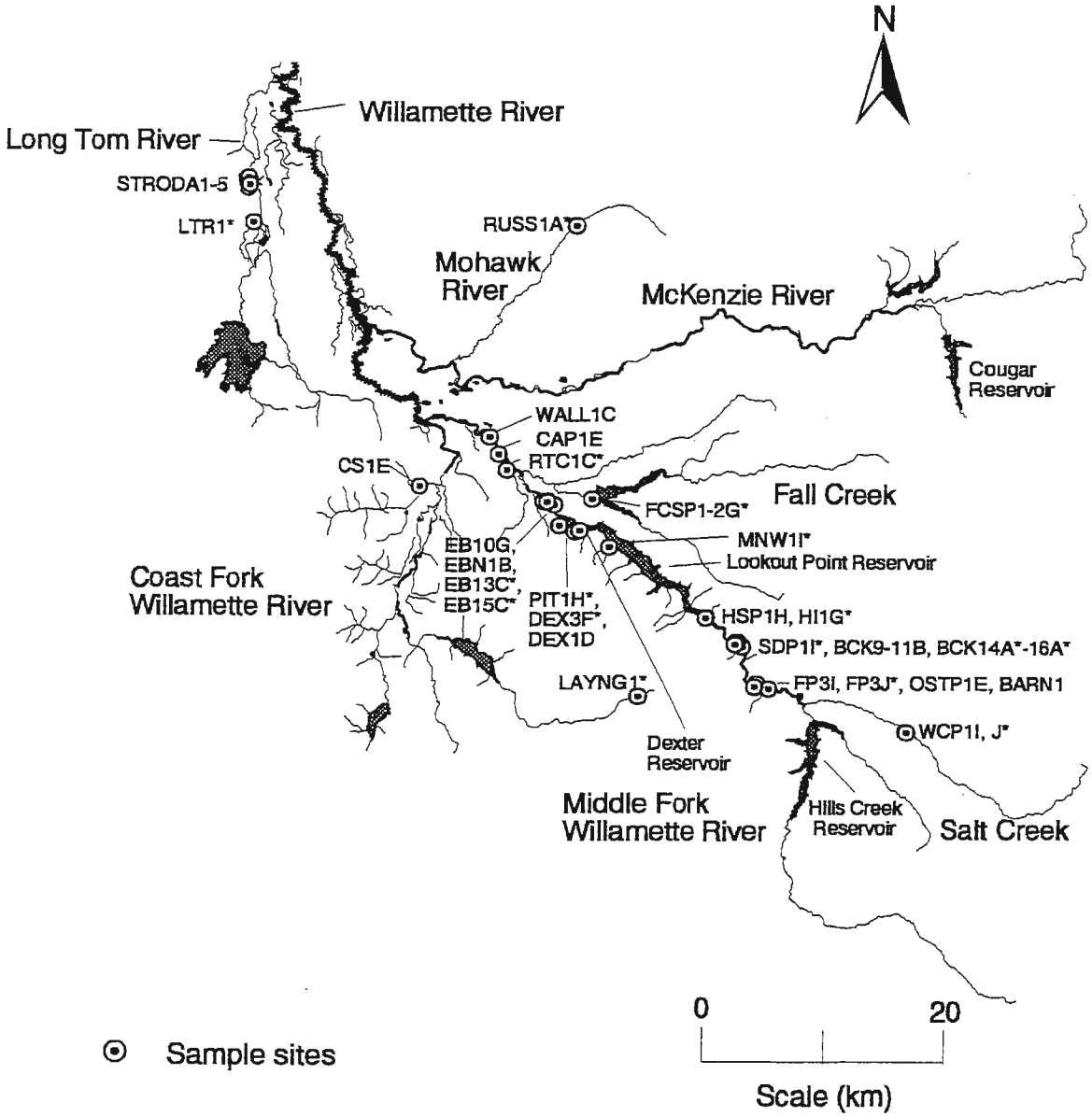


Figure 3. Survey locations for Oregon chub in the upper Willamette River drainage in 2000.

Minnow traps, measuring 23 by 46 centimeters with 64-millimeter mesh, were used to obtain mark-recapture population estimates of all fish species at selected sites. These traps were baited with a half slice of bread and set for 3-18 hours. We measured a subsample of the fish collected in the traps, gave all of them a partial caudal fin clip, and returned them to the water. This procedure was repeated for several days. Each subsequent day we marked all unmarked fish and counted all previously marked fish in the sample. Population estimates were made each day and the ratio of the number marked to the total estimate was compared to determine the approximate percentage of the total population that was marked. Fish were marked until approximately 15 percent of the population was marked. Fish were returned to the water. Population size was estimated using single-sample mark-recapture procedures (Ricker 1975). To calculate population abundance, we used the total number of marked fish, and the catch and recaptures from the last sample date. Confidence intervals were calculated using a Poisson approximation (Ricker 1975). Fish smaller than ~30 millimeters in length were not captured by the minnow traps, and were not included in the estimates. Excluded were all age 0 and some age 1 Oregon chub (Scheerer and McDonald 2000).

Bullfrogs were captured by angling at Fall Creek Spillway Pond on July 26-27, 2000 to determine their diet. Frogs were placed on ice in field, then frozen. Frogs were later thawed, sexed, snout-vent length was measured, and stomach contents were determined.

Water quality was monitored bi-monthly at Finley Gray Creek from September 1999 through October 2000. Water temperature and pH were recorded using an Orion® portable pH meter (model 250A). Dissolved oxygen was recorded using a YSI® Oxygen meter (model 57). Hourly readings of temperature and dissolved oxygen were taken on August 23, 2000 and September 20, 2000 for 24-hour periods using a Hydrolab® multimeter.

RESULTS

Sampling for Oregon chub was conducted throughout the middle and upper Willamette River basin (Figures 2-3). Detailed descriptions of habitat characteristics and the fish species present at each sample site are presented in **APPENDIX A**.

Santiam River Drainage

Thirty-four sites in the Santiam River drainage were sampled in 2000 (Figure 2). We confirmed the continued presence of Oregon chub at six locations in the basin (Geren Island, Santiam Conservation Easement, Gray Slough, Pioneer Park backwater, Santiam Public Works Pond, and Santiam I-5 backwaters). No Oregon chub were collected in 2000 from Logan Slough or Green's Bridge backwater, locations where they had been collected in 1997 and 1999, respectively. Non-native fish were collected from 21 of the 34 sites (62%) sampled in the drainage, including Geren Island, Green's Bridge backwater, Santiam I-5 backwaters, Santiam Public Works Pond, and the Santiam Conservation Easement sloughs. Nineteen new sites were sampled in the Santiam drainage in 2000. None contained Oregon chub and 14 contained non-native fish (74%).

Oregon chub abundance continued to decline at Geren Island in the North Santiam drainage. Non-native bluegill and bullhead were abundant, particularly in the North Pond. This increase in non-native fish abundance was first observed in August 1997. We believe these fish were not originally present at the site and entered during the 1996 floods.

Oregon chub population abundance continued to be depressed at the Santiam Conservation Easement sloughs in 2000. Only four Oregon chub were captured despite considerable sampling effort. The Santiam Conservation Easement is located near the confluence of the North and South Santiam Rivers. The habitat was altered by the flooding in 1996. New channels were formed, large amounts of fine sediment were deposited, aquatic vegetation was scoured or buried, and non-native fish invaded and/or expanded their range.

A concentrated effort was made to sample new locations in the South Santiam (lower 29 kilometers) and North Santiam drainages (lower 16 kilometers) to search for previously unknown populations of Oregon chub, or populations that might have become established following the 1996 floods. Off-channel habitat quality was good and beaver activity was widespread. Unfortunately, non-native fish were common and Oregon chub were not found.

A pond at Menear's Bend in the South Santiam drainage near Foster Reservoir was monitored during the summer 2000, prior to introducing Oregon chub (n=15) in October 2000. The introduced population of Oregon chub at Foster Pullout Pond was monitored and an additional 20 chub were stocked to supplement this population.

Mid-Willamette River Drainage

Twelve sites were sampled in the Mid-Willamette River drainage (Figure 2). Seven of these sites were sampled in previous years and revisited in 2000. We confirmed the continued presence of Oregon chub at Finley Gray Creek Swamp, Finley Display Pond, and Dunn Wetland Ponds. Non-native fish were collected from seven of the 12 locations (58%) surveyed in the drainage and four of the five new locations (80%) surveyed.

A large side-channel slough at Windsor Island (Marion County) was sampled. Sampling was requested prior to a proposed expansion of a gravel mining operation in the vicinity. Four sites were sampled (WIND1-3, CLAG1) including the side channel and a small tributary that enters the side-channel. No Oregon chub were collected; non-native fish were present at all sites.

Four sites in the Muddy Creek drainage (Benton County) on Finley National Wildlife Refuge were sampled. The population abundance in Gray Creek Swamp (FIN4G) was higher than that estimated in previous years (n=730). The population in Display Pond (FIN16G), location of a 1998 introduction, increased to 1,750 fish in 2000. Beaver Pond (FIN1E) and Cattail Pond (FIN7F), habitat enhancement sites and potential reintroduction sites, were also sampled. Non-native fish were collected from Cattail Pond and lower Gray Creek (FIN24A) downstream of Cattail Pond. Additional efforts to remove non-native fish (drain the pond) and to exclude non-native fish movement from lower Gray Creek are needed.

Oregon chub were introduced into the Dunn Wetland Ponds (DUNN2F*, DUNN6A*) in the Beaver Creek drainage in 1997-98. In 2000, the Dunn Wetlands supported the largest Oregon chub population (n=14,090) in the Willamette Valley. In addition, juvenile Oregon chub successfully colonized a new pond (DUNN7) that was created in the wetland in 1999.

A habitat restoration and potential introduction site was monitored at Ankeny National Wildlife Refuge. Habitat in the Dunlin-Woodduck Pond complex was enhanced in 1998. All of the newly created habitat was dry in early October. If additional water can be pumped or diverted into the ponds, the habitat will be ideal for Oregon chub.

Long Tom River Drainage

Six locations in the Long Tom drainage were sampled (Figure 3). Non-native fish were collected from five of these locations (84%). Five sloughs (STRODA1-5) on private farm land

near Monroe were sampled at the request of the U.S. Army Corps of Engineers (ACOE). We sampled to determine the presence or absence of Oregon chub, prior to the ACOE's replacement of an irrigation dam to provide better upstream passage for fluvial cutthroat trout. No Oregon chub were collected. All five sloughs contained multiple species of non-native fish (bass, bluegills, bullheads, western mosquitofish). A habitat enhancement pond on the Long Tom Ranch (LTR1*) was monitored in 1999. Stocked rainbow trout were the only fish present. Aquatic vegetation was sparse. Habitat suitability for Oregon chub will likely improve as the aquatic vegetation becomes better established.

McKenzie River Drainage

One site in the McKenzie River drainage was sampled in 2000 (Figure 3). We revisited a potential introduction site (Russell Pond) on private property in the Mohawk River drainage (RUSS1A). This site had habitat that was suitable for Oregon chub. The private landowner was open to potential future habitat enhancement work on his property. A "Safe Harbor Agreement" is in progress to permit introduction of Oregon chub into this pond, which lies outside the confirmed historic range of Oregon chub in this drainage.

Coast Fork Willamette River Drainage

One location, Camas Swale Creek (CS1E), in the Coast Fork Willamette River drainage was sampled in 2000 (Figure 3). This is the only location in the Coast Fork drainage where we have collected Oregon chub. Small numbers were collected in 1992 (n=1) and 1993 (n=2). No Oregon chub were collected in 1994, 1996, 1999, or 2000. Non-native bluegills and bullheads were common during prior sampling in this drainage.

Middle Fork Willamette River Drainage

Twenty-five sites in the Middle Fork Willamette River drainage were sampled in 2000; two sites were visited twice (Figure 3). We documented the continued presence of Oregon chub in East Fork Minnow Creek Pond (MNW1I*), Shady Dell Pond (SDP1I*), Dexter Reservoir Alcoves (PIT1H* and DEX3F*), Hospital Pond (HSP1H), Elijah Bristow State Park (EB10G, EBN1B), Oakridge Slough (OSTP1E), Wicopee Pond (WCP1I, WCP1J*), Fall Creek Spillway Ponds (FCSP1-2G*), Buckhead Creek (BCK9-11B), Middle Buckhead Enhancement Pond (BCK15A*), and Rattlesnake Creek (RTC1C*). Fish population estimates were obtained for all of these sites except Rattlesnake Creek and Middle Buckhead Enhancement Pond (see Population Estimates section). Populations of Oregon chub were generally stable or increasing in abundance at sites in the basin, with the exception of East Ferrin Pond (FP3I, FP3J*).

Three habitat enhancement ponds in the lower Buckhead Creek drainage (BCK14A*, BCK15A*, BCK16A*) were sampled in 2000. These ponds were constructed by U.S. Forest Service and the U.S. Army Corps of Engineers in September-October 1999, to provide additional off-channel habitat for Oregon chub. Oregon chub were collected from the lower pond (BCK14A*; n=1) and middle pond (BCK15A*; n=3). Fish entered the off-channel ponds during high winter flows. No fish were captured in the upper (upstream) pond (BCK16A*). The aquatic vegetation was well established in the middle and lower ponds. Habitat conditions were suitable for Oregon chub in these ponds.

Middle Buckhead Creek (BCK9-11B) was thoroughly sampled. Only small numbers were collected from this location prior to 1999. The habitat quality has improved markedly

since 1995 and Oregon chub were very abundant in 1999 and 2000 (see Population Estimates section).

No Oregon chub were collected from six locations in the Middle Fork Willamette River drainage where they were collected on at least one occasion between 1991-1999. These locations included Dexter Reservoir East Alcove (DEX1D; last collected in 1992), Jasper Slough (CAP1E*; last collected in 1994), Wallace Slough (WALL1C*; last collected in 1997), Elijah Bristow Gravel Pits (EB13C*, EB15C*; last collected in 1998), and Hospital Impoundment Pond (HI1G*; last collected in 1999).

Three Oregon chub were collected from Barnhard Slough. This slough is located near the former Ferrin Campground near Oakridge. We sampled the slough because of proposed bridge reconstruction on Highway 58 adjacent to the slough. Oregon chub were last collected from this location in 1983. We did not find Oregon chub when we sampled this site in 1992.

Non-native fish were collected from eight of the 25 sites (32%) sampled in this basin in 2000, including Rattlesnake Creek, Wallace Slough, Jasper Slough, East Ferrin Pond, Elijah Bristow Beaver Pond and Gravel Pits, and Hospital Impoundment Pond.

Population Estimates

In 2000, we obtained population estimates for Oregon chub at fifteen locations in the Mid-Willamette, Santiam, and Middle Fork Willamette River drainages (Table 2).

We estimated the population abundance of Oregon chub at nine locations in the Middle Fork Willamette River drainage. Oregon chub were most abundant at East Fork Minnow Creek Pond (n=5,050). The second largest population was at Fall Creek Spillway Ponds (n=5,030), site of a 1996 introduction. Other abundant populations include Wicopee Pond (n=4,580; site of a 1988 introduction), Shady Dell Pond (n=3,830), Middle Buckhead Creek (n=3,570), Hospital Pond (n=2,980), Elijah Bristow State Park (n=2,360), Dexter Reservoir Alcoves (n=2,320), and Oakridge Slough (n=140).

The Oregon chub population in East Ferrin Pond, site of a 1994 reintroduction, continued to decline. We were unable to capture any Oregon chub in May or September 2000, despite substantial sampling effort. The population declined from 7,200 chub in 1997 to 3,500 chub in 1998 and 60 chub in 1999. Largemouth bass were collected for the first time from this pond in 1998 and increased in both numbers and size in 1999.

We estimated the population abundance of Oregon chub at three locations in the Santiam River drainage. The Oregon chub population at Geren Island continued to decline (n=360). We estimated the Oregon chub population at 8,660 fish in 1997, 1,830 fish in 1998, and 860 fish in 1999. Non-native fish (bluegills and bullheads) were abundant in the North Pond and collected in the North Channel. The Oregon chub population in the Santiam Conservation Easement sloughs remained depressed. Only four Oregon chub were collected in 2000; thirteen chub were collected in 1999. This population totaled 1,250 Oregon chub in 1994 and declined substantially following the 1996 floods. The Oregon chub population, introduced in 1999 into the Foster Pullout Pond, remained stable (85 fish were introduced in 1999 and the 2000 estimate was 80 fish).

We estimated the population abundance of Oregon chub at three locations in the Mid-Willamette River drainage. The Oregon chub population in Gray Creek Swamp (Finley National Wildlife Refuge) was estimated to be 730 fish, higher than estimates in 1993-1999. The Oregon chub population introduced in 1998 into Display Pond (Finley National Wildlife Refuge) increased from 360 fish in 1999 to 1,750 fish in 2000. The Oregon chub population estimate in

Table 2. Estimates of the population abundance of Oregon chub at locations in the Willamette Valley, Oregon from 1992-2000.

Location	Date	Estimate	95% Confidence Intervals lower	upper
	Santiam River Drainage			
Santiam Conservation Easement (SCE1-4, SCE7)	May 1994	1,250	1,010	1,660
	May 1996	830	580	1,430
	May 1997	300	200	460
	May 1998	250	160	530
	May 1999	13 captured, no estimate possible		
	April 2000	4 captured, no estimate possible		
Geren Island (GER4, GER6)	May 1996	3,430	2,900	4,220
	November 1996[1]	8,340	5,450	16,100
	May 1997	8,700	7,420	10,440
	May 1998	1,830	1,170	4,350
	May 1999	860	580	1,580
	April 2000	360	210	1,230
Foster Pullout Pond[2] (FOS2)	October 2000	80	40	320
	Mid-Willamette River Drainage			
Finley Gray Creek Swamp (FIN4)	May 1993[3]	370	300	480
	September 1994	600	460	860
	September 1995	460	340	710
	September 1996	470	340	740
	October 1997	520	420	680
	October 1998	620	460	930
	September 1999	510	270	2,320
	April 2000	730	540	1,150

Table 2. (continued).

Location	Date	Estimate	95% Confidence Intervals lower	upper
Finley Display Pond[4] (FIN16)	September 1999	360	240	790
	October 2000	1,750	1,060	5,050
Dunn Wetland Ponds[5] (DUNN2,6)	October 1998	460	290	1,000
	September 1999	4,860	3,070	11,690
	October 2000	14,090	11,500	18,210
	Middle Fork Willamette River Drainage			
Dexter Reservoir Alcoves[6] (PIT1, DEX3)	May 1992	780	560	1,100
	May 1995	140	80	400
	September 1996	40	20	200
	September 1997	2,250	1,740	3,230
	September 1998	1,280	970	1,950
	September 1999	1,180	940	1,570
	September 2000	2,230	1,610	4,220
Elijah Bristow State Park (EB10, EBN1)	May 1993	4,000	3,200	5,400
	May 1995	1,900	1,400	3,200
	May 1997	2,010	1,700	2,440
	May 1998	5,350	4,010	8,060
	May 1999	3,780	2,920	5,360
	May 2000	2,360	1,840	3,600
Hospital Pond (HSP1)	May 1993	690	470	1,300
	May 1995	780	510	1,390
	May 1997	3,160	2,480	4,370
	May 1998	3,030	2,050	5,780
	May 1999	3,020	2,330	4,290
	May 2000	2,980	2,050	5,410

Table 2. (continued).

Location	Date	Estimate	95% Confidence Intervals lower	upper
E. Fork Minnow Creek Pond (MNW1)	May 1993	8,800	8,300	9,300
	September 1994	7,500	6,400	8,600
	September 1995	7,100	6,300	8,100
	September 1996	4,500	4,000	5,200
	September 1997	4,000	3,400	4,900
	September 1998	4,440	3,940	5,100
	September 1999	4,780	4,100	5,720
	September 2000	5,050	4,130	6,490
Shady Dell Pond (SDP1)	May 1993	1,600	1,400	1,900
	September 1994	4,800	4,300	5,400
	September 1995	3,800	3,400	4,300
	September 1996	4,200	3,800	4,800
	September 1997	3,800	3,400	4,300
	September 1998	3,650	3,170	4,300
	September 1999	2,860	2,520	3,300
	September 2000	3,830	3,260	4,650
Middle Buckhead Creek (BCK9-11)	May 1999	3,010	2,620	3,540
	May 2000	3,570	2,950	4,530
Oakridge Slough (OSTP1)	May 1999	480	310	1,050
	May 2000	140	70	420
Fall Creek Spillway Ponds[7] (FCSP1-2)	September 1997	475	400	590
	September 1998	1,400	960	2,660
	September 1999	6,300	5,460	7,450
	September 2000	5,030	4,060	6,620

Table 2. (continued).

Location	Date	Estimate	95% Confidence Intervals lower	upper
East Ferrin Pond[8] (FP3)	September 1995	3,500	2,700	5,000
	September 1996	5,600	4,800	6,800
	September 1997	7,200	6,200	8,500
	September 1998	3,500	2,320	7,080
	May 1999	60	28	90
	May 2000	0		
Wicopee Pond (WCP1)[9]	September 2000	4,580	3,600	6,290

[1]A total of 4,654 Oregon chub were relocated from Geren Island channels and filters to North Pond prior to this estimate.

[2]A total of 105 Oregon chub were introduced from Geren Island to Foster Pullout Pond in 1999 (n=85) and 2000 (n=20).

[3]The 1992 estimate includes only the National Wildlife Refuge portion of the swamp and not the portion on private land.

[4]A total of 105 Oregon chub were moved from Gray Creek Swamp to Display Pond in 1998 (n=60) and 1999 (n=45).

[5]A total of 573 Oregon chub were introduced to this site: 200 from Elijah Bristow in 1997, 300 from Geren Island in 1998, and 73 from Shady Dell Pond in 1998. The latter fish were first used for laboratory spawning experiments in 1997-1998.

[6]Prior to 1997, no estimates were made in site "DEX3" due to small numbers of Oregon chub captured.

[7]A total of 500 Oregon chub were introduced from Shady Dell Pond (n=150) and East Fork Minnow Creek Pond (n=350) in 1996.

[8]A total of 574 Oregon chub were introduced from East Fork Minnow Creek Pond in 1994.

[9]A total of 50 fish were introduced from Dexter Reservoir Alcove "PIT1" in 1988.

Dunn Wetland Ponds was 14,090 fish, up from 4,860 fish in 1999.

The fish community assemblages at locations containing Oregon chub were studied to better understand the factors that favored abundant Oregon chub populations. Beginning in 1997, we obtained estimates of the population abundance for all species of fish that occurred at Oregon chub sites (Table 3, Figure 4). We determined which species were present and determined their abundance relative to Oregon chub in order to monitor changes that occur in the fish communities from year to year. In 2000, Oregon chub were the most abundant fish species at 11 locations. Nine of these 11 locations supported adult Oregon chub populations totaling 1,000 or more individuals. At locations where Oregon chub were not the numerically dominant species, only one site (Middle Buckhead Creek) had an Oregon chub population that exceeded 1,000 fish. At several locations where Oregon chub were not the numerically dominant species, the Oregon chub population experienced a recent decline in abundance (Santiam Conservation Easement, Geren Island, East Ferrin Pond). Non-native fish increased in abundance relative to that of the other fish species at these locations.

Bullfrog Diet Analysis

Bullfrog diets were analyzed to determine whether fish, particularly Oregon chub, were consumed by adult bullfrogs. Forty-nine bullfrogs were captured, ranging in size from 7-14.5 cm. More females (n=33; 67%) were captured than males (n=10; 20%) or immature juveniles (n=6; 12%). Fish were found in the stomachs of four bullfrogs (8%). Two fish were identified as Oregon chub (4% of stomachs) and two were unidentified fish. Other items in the diet included northwest salamanders, juvenile bullfrogs, snails, a young rodent, annelids, terrestrial insects, and aquatic insects.

Water Quality Monitoring at Gray Creek, Finley Refuge

Water quality has been a concern in Gray Creek on Finley National Wildlife Refuge for several years. Dead fish, found with mouths open and gills flared (indicating respiratory stress), have been found in minnow traps set for as little as two hours. In 1999, water levels in the creek were low and an orange color was found throughout the beaver ponds and channels in upper Gray Creek. Analyses of water samples found high iron levels in the water and the presence of iron bacteria. Dissolved oxygen levels were found to be low (<35% saturation). Conditions of high iron and low oxygen were typical of waters with substantial spring water influx. It is assumed this was the cause of the orange color and low dissolved oxygen in Gray Creek. Water quality monitoring showed that oxygen levels were lowest in late summer months (Table 4). When we sampled hourly over a 24-hour period, we found that dissolved oxygen levels were lowest in the morning hours (Table 5).

DISCUSSION

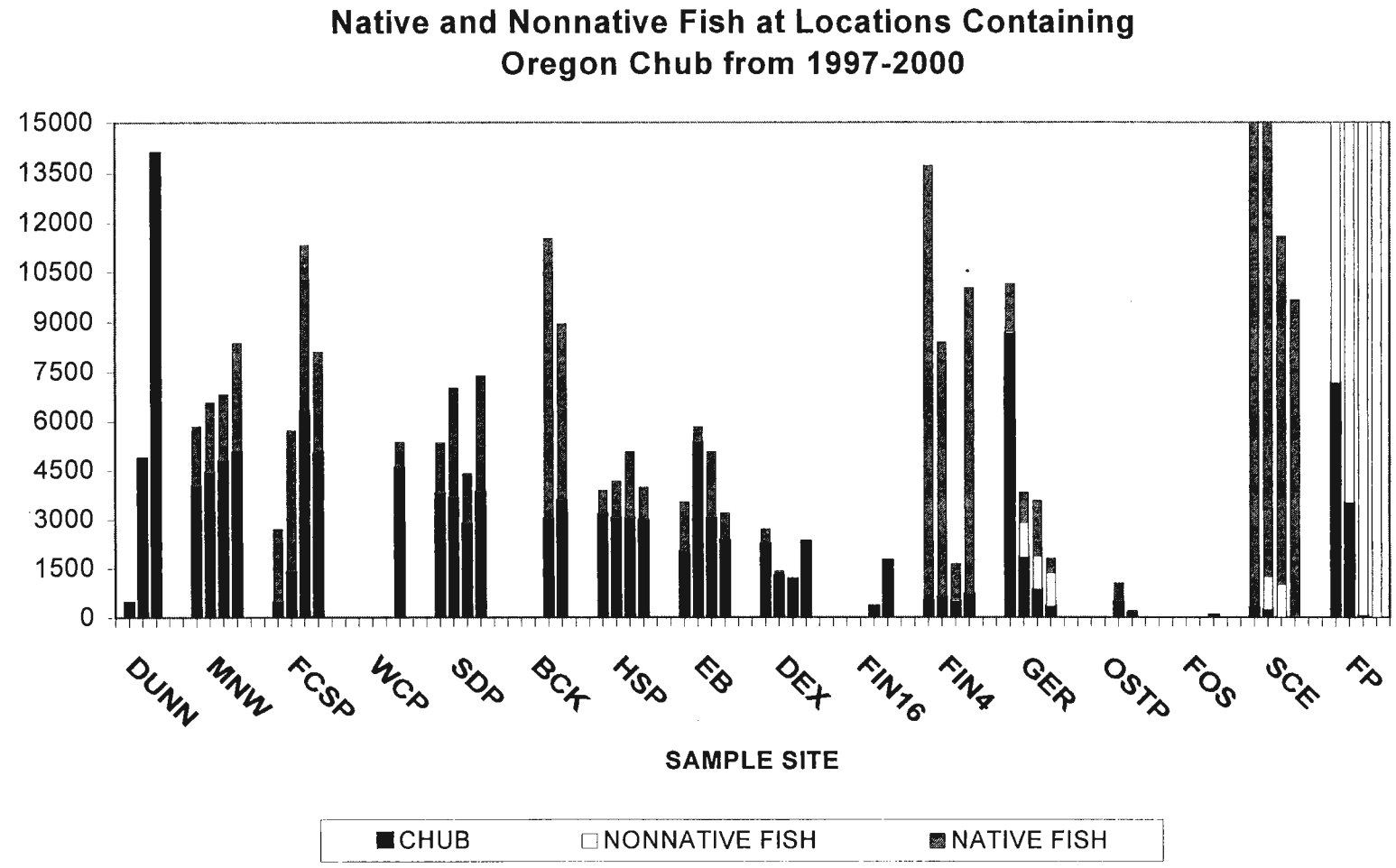
The Oregon Chub Recovery Plan set recovery goals for downlisting the species to "threatened" and for delisting the species (U.S. Fish and Wildlife Service 1998). The criteria for downlisting the species was to establish and manage ten self-sustaining populations of at least 500 adult fish. All populations must exhibit a stable or increasing trend for five years. At least three populations must be located in each of the three sub-basins (Middle Fork Willamette River, Santiam River, Mid-Willamette River tributaries). Currently there are 11 populations totaling 500 or more individuals (Table 1). Six of these populations have exhibited a stable or increasing

Table 3. Estimates of population abundance of Oregon chub and other fish species at locations in the Willamette Valley, Oregon in 2000. Estimates without confidence limits are approximations.

Location	Species	Estimate	95% Confidence Intervals lower	upper
	Santiam River drainage			
Geren Island	Oregon chub	360	210	1,230
	redside shiners	440	240	2,190
	bluegills	>1,000		
	bullheads	>100		
Santiam Conservation Easement	Oregon chub	only 4 captured		
	threespine sticklebacks	9,550	4,820	38,180
	sculpins	390	180	1,060
	western mosquitofish	>1,000		
	sculpins	>50		
	northern pikeminnow	>20		
	redside shiners	>25		
Foster Pullout Pond	Oregon chub	80	40	320
	Mid-Willamette River drainage			
Finley Gray Creek Swamp	Oregon chub	730	540	1,150
	redside shiners	4,080	3,560	4,800
	specked dace	2,100	1,640	2,910
	threespine sticklebacks	3,090	1,450	9,270
Finley Display Pond	Oregon chub	1,750	1,060	5,050
Dunn Wetland Ponds	Oregon chub	14,090	11,500	18,210
	Middle Fork Willamette River drainage			
E. Fork Minnow Creek Pond	Oregon chub	5,050	4,130	6,490
	redside shiners	1,460	930	3,360
	speckled dace	1,870	1,490	2,520

Table 3. (continued).

Location	Species	Estimate	95% Confidence Intervals lower	upper
Shady Dell Pond	Oregon chub	3,830	3,260	4,650
	redside shiners	2,900	2,070	4,830
	speckled dace	650	420	1,420
East Ferrin Pond	Oregon chub	0		
	western mosquitofish	>50,000		
	largemouth bass	>100		
Hospital Pond	Oregon chub	2,980	2,050	5,410
	redside shiners	980	490	3,900
	sculpins	>30		
Dexter Reservoir Alcoves	Oregon chub	2,320	1,610	4,220
	northern pikeminnow	>20		
Middle Buckhead Creek	Oregon chub	3,570	2,950	4,530
	redside shiners	3,590	3,090	4,270
	speckled dace	1,770	1,370	2,470
Oakridge Slough	Oregon chub	140	60	420
	speckled dace	>40		
	redside shiners	>40		
Wicopee Pond	Oregon chub	4,580	3,600	6,290
	speckled dace	790	550	1,440
Fall Creek Spillway Ponds	Oregon chub	5,030	4,060	6,620
	speckled dace	3,090	2,430	4,270
Elijah Bristow State Park	Oregon chub	2,360	1,840	3,600
	redside shiners	510	270	3,670
	speckled dace	340	250	530
	threespine sticklebacks	>30		



ıre 4. Population abundance of fish species collected at sites containing Oregon chub in 1997 (left bar), 1998 and 1999 (midd
) and 2000 (right bar). Site Codes: DUNN= Dunn Wetland Ponds, MNW= East Fork Minnow Creek Pond, FCSP= Fall Creek
way Ponds, WCP= Wicopee Pond, SDP= Shady Dell Pond, BCK= Buckhead Creek, HSP= Hospital Pond, EB= Elijah Bristow
e Park Sloughs, DEX= Dexter Reservoir Alcoves, FIN16= Finley Display Pond, FIN4= Finley Gray Creek Swamp, GER= Gere
nd, OSTP= Oakridge Slough, FOS= Foster Pullout Pond, SCE= Santiam Conservation Easement, FP= East Ferrin Pond.

Table 4. Water quality measurements from Gray Creek, Finley National Wildlife Refuge. Site 1 was in a beaver pond where the staff gauge was located. Site 2 was a beaver pond located ~400 meters upstream of site 1. Site 3 was in the creek channel ~800 meters upstream of site 2. Dissolved oxygen (DO) is shown in milligrams per liter.

Date		Site 1	Site 2	Site 3	weather/staff
9-23-99	temp		12.2 - 13.5		sunny
	pH		7.1		
	DO		2.3 - 4.5		
10-13-99	temp	14.4	13.8	15.8	staff=1.35'
	pH	6.9	7.1	7.2	sunny
	DO	2.3	2.6	5.6	
10-27-99	temp	9.0	8.1	8.0	staff=1.45'
	pH	7.7	7.8	8.1	rainy
	DO	4.0	2.9	6.3	
11-10-99	temp	10.9	10.9	10.9	staff=2.60'
	pH	7.1	7.8	8.1	rainy
	DO	5.2	6.6	7.4	
11-24-99	temp	9.4	9.3	9.4	staff=2.70'
	pH	7.1	7.5	7.6	rainy
	DO	5.5	6.4	6.3	
12-9-99	temp	10.0	10.1	10.1	staff=2.80'
	pH	7.3	7.4	7.3	rainy
	DO	6.8	6.2	5.9	
12-24-99	temp	7.3	7.1	7.2	staff=2.75'
	pH	7.3	7.5	7.4	cloudy
	DO	6.2	6.6	6.5	
1-4-00	temp	8.5	8.5	8.5	staff=2.80'
	pH	6.9	7.1	7.2	rainy
	DO	6.8	6.7	6.8	
1-21-00	temp	8.7	8.6	8.7	staff=2.80'
	pH	7.3	7.1	7.8	rainy
	DO	6.6	7.1	7.6	
2-2-00	temp	9.3	9.2	9.1	staff=2.80'
	pH	7.1	7.3	7.2	clear
	DO	6.4	7.3	6.3	
2-19-00	temp	8.0	8.0	8.3	staff=2.75'
	pH	7.4	7.5	7.3	rainy
	DO	7.2	6.9	6.7	
3-2-00	temp	10.3	10.2	10.1	staff=2.75'
	pH	6.6	7.2	6.9	
	DO	6.6	6.8	6.3	
3-17-00	temp	8.4	8.5	9.4	staff=2.70'
	pH	7.1	7.4	7.4	rainy
	DO	5.6	6.4	5.9	
4-1-00	temp	15.1	13.0	11.2	staff=2.70'
	pH	6.5	6.9	6.5	sunny
	DO	5.6	7.2	6.8	

Table 4. (continued).

Date		Site 1	Site 2	Site 3	weather/staff
4-14-00	temp	13.4	11.4	11.9	staff=2.75'
	pH	6.6	7.4	7.5	clear
	DO	5.1	5.7	6.4	
4-28-00	temp	11.9	12.1	12.1	staff=2.75'
	pH	7.0	7.1	7.3	showers
	DO	5.0	7.2	6.8	
5-11-00	temp	8.9	8.8	8.9	staff=2.80'
	pH	6.4	7.3	6.8	showers
	DO	5.9	6.8	6.3	
5-22-00	temp	16.5	16.3	16.3	staff=2.80'
	pH	7.4	7.4	7.2	sunny
	DO	3.2	3.8	4.2	
6-8-00	temp	15.1	14.9	13.6	staff=2.85'
	pH	7.0	7.2	7.0	showers
	DO	2.7	4.0	5.9	
6-22-00	temp	19.3	19.6	18.2	staff=2.80'
	pH	7.3	7.5	7.4	sunny & warm
	DO	3.5	5.4	6.3	
7-9-00	temp	22.5	22.5	18.2	staff=2.70'
	pH	7.2	7.2	7.2	cloudy, rain prior
	DO	3.0	5.6	5.9	
7-25-00	temp	22.4	20.4	17.3	staff=2.55'
	pH	7.3	7.4	7.4	sunny, dry, warm
	DO	3.2	4.6	4.7	
8-7-00	temp	25.7	24.3	19.8	staff=2.50'
	pH	7.1	7.1	7.4	sunny, dry, warm
	DO	3.2	3.0	4.2	orange at site #2
8-24-00	temp	23.5	21.9	18.4	staff=2.10'
	pH	6.7	7.1	7.3	sunny, warm
	DO	3.6	3.8	5.0	orange downstream site #1
9-7-00	temp	19.8	17.5	16.1	staff=2.30'
	pH	7.4	7.3	7.1	sunny, warm (rain week before)
	DO	2.0	2.1	1.9	orange at sites #1 and #2
9-20-00	temp	23.2	20.3	18.1	staff= 2.00'
	pH	7.5	7.7	7.8	partly cloudy
	DO	-	4.5	4.9	orange at sites #1 and #2
10-11-00	temp	13.8	14.1	12.7	staff=2.70'
	pH	8.0	8.1	8.1	cloudy, light rain
	DO	5.0	7.4	7.9	no orange color

Table 5. Hourly temperature and dissolved oxygen measurements at Gray Creek, Finley National Wildlife Refuge, on August 23-24, 2000 and September 20-21, 2000.

Date: August 23-24, 2000

Time	Temperature (C)	Dissolved Oxygen % saturation	Dissolved Oxygen mg/l
3:00 PM	21.4	44.1	3.9
4:00 PM	22.8	34.3	2.9
5:00 PM	23.5	40.7	3.4
6:00 PM	23.3	49.9	4.2
7:00 PM	22.9	52.6	4.5
8:00 PM	22.2	47.3	4.1
9:00 PM	21.3	50.2	4.4
10:00 PM	20.5	43.8	3.9
12:00 PM	19.9	36.9	3.3
12:00 AM	19.4	35.0	3.2
1:00 AM	19.0	30.6	2.8
2:00 AM	18.6	29.5	2.7
3:00 AM	18.2	27.1	2.5
4:00 AM	17.9	27.4	2.6
5:00 AM	17.6	28.5	2.7
6:00 AM	17.4	26.9	2.6
7:00 AM	17.3	28.3	2.7
8:00 AM	17.2	27.5	2.6
9:00 AM	17.1	26.4	2.5
10:00 AM	17.1	26.4	2.5
11:00 AM	17.4	27.3	2.6
12:00 PM	17.8	33.3	3.1
1:00 PM	18.7	38.5	3.6
2:00 PM	19.8	43.6	3.9
3:00 PM	20.6	45.0	4.0
4:00 PM	21.2	44.5	3.9

Date: September 20-21, 2000

Time	Temperature (C)	Dissolved Oxygen % saturation	Dissolved Oxygen mg/l
6:00 PM	18.9	67	6.2
7:00 PM	19.0	61	5.5
8:00 PM	19.0	55	5.0
9:00 PM	18.7	49	4.5
10:00 PM	18.6	45	4.1
12:00 PM	18.4	41	3.8
12:00 AM	18.2	38	3.6
1:00 AM	17.9	35	3.3
2:00 AM	17.6	32	3.0
3:00 AM	17.4	29	2.8
4:00 AM	17.2	26	2.5
5:00 AM	17.0	23	2.2
6:00 AM	16.8	20	1.9
7:00 AM	16.7	22	2.2
8:00 AM	16.7	25	2.4
9:00 AM	16.6	30	2.9
10:00 AM	16.6	31	3.0
11:00 AM	16.6	34	3.3
12:00 PM	16.7	38	3.7
1:00 PM	16.8	40	3.9
2:00 PM	17.0	44	4.2
3:00 PM	17.3	49	4.7
4:00 PM	17.6	57	5.5
5:00 PM	17.8	63	6.1

trend for the past five years. The criteria for delisting the species was to establish 20 self-sustaining populations of at least 500 adult fish. All populations must exhibit a stable or increasing trend for seven years. At least four populations must be located in each of the three sub-basins.

Monitoring Naturally Occurring Populations

We monitored the status and trends of known populations of Oregon chub by obtaining estimates of population abundance (Table 2). These estimates allowed us to assess the status of Oregon chub in relation to recovery goals stated in the Oregon Chub Recovery Plan. Currently, a major recovery effort has focused on the reintroduction of Oregon chub into suitable habitat within their historic range. We used abundance estimates to monitor the status of natural populations and to determine which populations of Oregon chub were the best candidates (least risk) as donor populations for reintroduction efforts. We subsequently determined the maximum number of fish that could safely be removed from a site in any year. Oregon Department of Fish and Wildlife policy states that a maximum of 10% of a population may be removed for an introduction in any one year. Typically, a minimum of 300 fish have been introduced when establishing a new population to avoid genetic bottlenecks.

In 2000, seven naturally occurring populations of Oregon chub totaled 500 or more individuals. Six of these populations were located in the Middle Fork Willamette River drainage. These include populations in East Fork Minnow Creek Pond (n=5,050), Shady Dell Pond (n=3,830), Middle Buckhead Creek (n=3,570), Hospital Pond (n=2,980), Elijah Bristow State Park (n=2,360), Dexter Reservoir Alcoves (n=2,320), and Finley Gray Swamp (n=730).

The Middle Fork Willamette River populations were generally stable or increasing in abundance. In contrast, the populations in the Santiam River drainage decreased in abundance in recent years. Many locations in the Santiam drainage were impacted by the 1996 floods and the habitats were invaded by non-native fish. The abundance of Oregon chub at Geren Island declined dramatically during the period from 1997-2000. The Oregon chub population abundance in the Santiam Conservation Easement sloughs also declined following the 1996 floods and remains depressed. Only 4 Oregon chub were collected from the Santiam Conservation Easement sloughs in 2000, despite substantial sampling effort.

The 2000 population estimate for Oregon chub in Gray Creek Swamp (Finley National Wildlife Refuge) was 730 fish. The population abundance in Gray Creek Swamp has remained stable since estimates were first obtained in 1993. We obtained population estimates in May 2000 instead of September (the usual month for population estimates at this location) to minimize the stress on the fish. The water levels and dissolved oxygen levels were higher in the spring. In 1996-1999, dead fish were occasionally found in the minnow traps. The cause of death was unknown, although poor water quality (low dissolved oxygen) was the suspected cause. In the summers of 1999 and 2000, the water in the swamp had a deep orange color, due to the presence of iron and iron bacteria. Springs contributed the bulk of the inflow in the late summer. Spring water can be anoxic and contain large amounts of iron. Between September 1999 and October 2000, we monitored water quality (temperature, dissolved oxygen, and pH) bi-monthly at three locations in the upper Gray Creek drainage. We documented the late summer decline in dissolve oxygen levels in the swamp (Table 4). Despite these conditions in 1999, the Oregon chub population increased slightly in abundance, suggesting an inherent tolerance to low oxygen conditions.

Despite finding several new populations of Oregon chub in recent years, recovery has been slowed by concurrent losses or declines of other populations. Oregon chub have not been collected in recent years from several sites where they were previously found. These include

Dexter Reservoir East Alcove, Jasper Park Slough, Elijah Bristow Northeast Slough, Wallace Slough, Logan Slough, and Camas Swale (Table 1). In addition, non-native fish either colonized or were illegally introduced into Elijah Bristow beaver pond and two previously considered reintroduction sites (Morgan Lake at Ankeny Refuge and Fairbanks Ponds).

Monitoring Introductions and Restoration Sites

Several Oregon chub reintroductions and habitat restoration projects were monitored in 2000. These include East Ferrin Pond, Hospital Impoundment Pond, Finley National Wildlife Refuge restoration projects in the Gray Creek drainage (Display, Cattail, and Beaver Ponds), Dunn Wetland Ponds, Wicopee Pond, the Lower Buckhead Enhancement Ponds, and the Long Tom Ranch Pond.

The Ferrin Ponds were the site of a habitat restoration project completed by the U.S. Forest Service in 1993. These former borrow pits were deepened and permanent water control structures were constructed. Attempts were made to remove non-native fish (largemouth bass, western mosquitofish, crappies) using a rotenone treatment. Oregon chub were introduced into West Ferrin Pond (n=525) and East Ferrin Pond (n=573) in 1994. Oregon chub were collected from both ponds in May 1995. No Oregon chub have been collected in West Ferrin Pond since May 1995. The rotenone treatment was ineffective in eliminating the western mosquitofish. Western mosquitofish first reappeared in 1995 and quickly became abundant in both ponds. Other scientists attempting to recover endangered fish (ex.- Meffe 1983, 1984) have also found chemical treatments to be ineffective in the removal of western mosquitofish. In 1997, we estimated the Oregon chub population abundance in East Ferrin Pond at 7,200 fish. In 1998, the Oregon chub population dropped to 3,500. In 1999, the population was estimated at 60 fish. No Oregon chub were collected in 2000. Largemouth bass, some exceeding 30cm in length, were observed in the pond for the first time in 1998. Observations suggest they were larger and more abundant in 1999 and 2000. The bass were illegally stocked into the pond. The rapid increase in size of the Oregon chub population between 1994-1997 was encouraging, showing the potential of Oregon chub to rapidly colonize new habitats when conditions are suitable. However, the recent collapse of the population illustrates the continued threat that non-native predators (ex.-largemouth bass) pose to Oregon chub survival and recovery.

The Hospital Impoundment Pond in Lookout Point Reservoir was constructed by the U.S. Forest Service and the U.S. Army Corps of Engineers in October 1994. This pond was excavated in a former railroad grade, in the drawdown zone of the reservoir. The outflow from Hospital Pond was diverted into the pond. The project was designed to benefit western pond turtles and Oregon chub. The fish community in this pond varies each year, depending on which species enter the pond from Lookout Point Reservoir or Hospital Pond. Non-native fish, which originate from the reservoir, were collected in 1995, 1997, 1998, 1999 and 2000. Only a few Oregon chub were collected in 1995, 1997, and 1999. The pond appears to provide few benefits for Oregon chub.

A multi-year habitat enhancement project is in progress in the middle Gray Creek drainage on Finley National Wildlife Refuge. The goal was to make the middle Gray Creek drainage more suitable for Oregon chub by restricting upstream movement of non-native fish from Cabell Marsh (lower Gray Creek) and Muddy Creek into Cattail and Beaver Ponds, and to deepen the ponds to prevent them from drying up in the summer months. Both Cattail Pond and Display Pond (located on a small tributary to Gray Creek) were drained in the summer of 1996 to remove the non-native fish. In 1998, Cattail Pond was drained, the dike was repaired, the water control structure was replaced, and the pond was deepen and enlarged. A selective fish bypass system will be constructed at the water control structure in 2001. Ideally, it will allow

passage of fluvial cutthroat trout while preventing passage of non-native fish. The bypass structure will be adjustable and a trap will be incorporated to assess the effectiveness and to modify the structure, if necessary. Non-native fish were collected in Cattail Pond in 1999 and 2000, suggesting that the water control structure does not currently prevent movement of non-native fish from lower Gray Creek. Future enhancement work is planned to repair the dike and to deepen Beaver Pond, which is located upstream of Cattail Pond. We will continue to monitor the ponds to determine whether the selective bypass structure is effective and if Oregon chub colonize the site from upper Gray Creek. In 1998-1999, Oregon chub (n=105) were introduced into Display Pond from Gray Creek Swamp. The population expanded to 1,750 adults in 2000.

A large habitat enhancement project, designed to benefit waterfowl, was completed on the Dunn property in the Benton County in 1994. Approximately 12 hectares of wetland were restored and several ponds were constructed. One spring fed pond (DUNN2G*) was determined to be suitable for Oregon chub in 1996. Oregon chub were introduced into this pond in October 1997 (n=200) and May 1998 (n=300). A second habitat enhancement project on the Dunn property in the Benton County was completed in September 1997. A spring fed, 0.8 hectare, shallow water pond (DUNN6B*) was constructed adjacent to pond DUNN2G*. The ponds were connected during the winter months. Seventy-three Oregon chub were introduced into this pond in 1998. In October 2000, the Oregon chub population totaled 14,090 individuals (6,420 in DUNN2G* and 7,660 in DUNN6B*) and was the largest population in the valley. In addition, Oregon chub colonized a new 0.3 hectare pond that was created in 1999 (n=22 juveniles collected).

Wicopee Pond was the site of a 1988 introduction of 50 Oregon chub from the Dexter Reservoir Alcove "PIT1". It was a former borrow pit adjacent to Salt Creek in the Middle Fork Willamette River drainage. Small numbers of Oregon chub were collected from the pond between 1992 and 1999. The population increased dramatically in 2000 (estimate=4,580). Most of the fish collected were of a small size suggesting good survival and growth of a strong 1999 year class. The conditions leading to this sudden, dramatic increase are unknown.

Three shallow off-channel ponds, with surface areas of 300-500 m^2 each, were constructed by the U.S. Forest Service in 1998 in the lower Buckhead Creek drainage. These ponds were created to enhance the off-channel habitat available for Oregon chub. Oregon chub were collected from the lower (n=1) and middle ponds (n=3) in 2000. The habitat conditions improved in 2000 (aquatic vegetation became more established) due, in part, to selective thinning of the adjacent canopy by the U.S. Forest Service to decrease shading of the pond.

A wetland restoration project in the Long Tom drainage was completed in 1999. One pond, designed to hold water year round, was created for the potential introduction of Oregon chub. This pond (LTR1*) is approximately 1,500 square meters with a maximum depth of ~2.5 meters. Little aquatic vegetation had become established by October 2000. No non-native fish were collected in 2000. We will continue to monitor this pond in future years.

Identification and Evaluation of Potential Introduction Sites

Potential Oregon chub introduction sites were identified and evaluated using the following guidelines:

1. Restrict introductions to the historic distribution of Oregon chub.
2. Restrict introductions to protected sites that are secure from imminent or future threats of habitat destruction *(invasion by warmwater fish is included in this category).*
3. Restrict introductions to sites where the potential for dispersal has been determined and is acceptable *(all proposed sites meet this criterion).*

4. Restrict introductions to sites that likely fulfill life history requirements. Features include small ponds, less than 1,000 meters elevation, depositional substrate, gradually sloping banks, varied and abundant aquatic vegetation, little or no water velocity, mostly less than 2 meters deep, limited use or access by the public, no non-native fish species, and summer water temperature exceeding 16°C. Site manipulations to comply with this guideline are permissible. Introductions and site manipulations will be coordinated with landowners of proposed sites. A site management plan will be developed prior to introduction and coordination will occur with the landowner and/or managing agencies.
5. Restrict introductions to sites that contain sufficient habitat to support a genetically viable population *(all proposed sites meet this criterion).*
6. Prohibit introductions into areas where other rare or endemic taxa could be adversely affected *(all proposed sites meet this criterion because Oregon chub are not a known threat to any rare or endemic taxa).*

The following is a description of those locations being considered as potential reintroduction sites for Oregon chub. Jamplaski Pond was added to the list in 2000.

1. *Beaver and Cattail Ponds (Gray Creek)*- These sites are located on the Finley National Wildlife Refuge in Benton County. Habitat enhancement work in Cattail Pond was completed in 1998. The dike was reconstructed, the pond was deepened, and the water control structure was replaced. In 2001, a fish passage structure will be constructed that would allow the upstream movement of fluvial cutthroat trout while preventing the upstream movement of non-native fish. Cattail Pond was drained in 1996 and 1997 to eliminate bullheads, bluegills, and bullfrog tadpoles. Non-native fish invaded the site in 1999. The habitat will need to be drained to remove them. Oregon chub were not collected, but could colonize the pond from upper Gray Creek in the future. Beaver Pond, located between Cattail Pond and Gray Creek Swamp, dries up almost every summer. The habitat is similar to that in Cattail Pond. Oregon chub were collected in Beaver Pond in 1990 (personal communication, Dr. Douglas Markle, Oregon State University). Future habitat enhancement is planned to reconstruct the dike on Beaver Pond and to deepen the pond to maintain water levels throughout the summer months. Monitoring of the habitat condition and fish communities in these ponds will continue in the future.

2. *Brown Creek Swamp*- This site is located on Finley National Wildlife Refuge in Benton County. It consists of a series of beaver dams and ponds. Sculpins and redlegged frogs are present. The site has good quality Oregon chub habitat in the lower beaver ponds; aquatic vegetation is abundant. The site is large, approximately 700 meters long with varying widths. Since 1995, the habitat has improved as cattle grazing was eliminated and beaver expanded their activity into the western portion of the creek. Water levels were quite low in the summers of 1997-1999 and the wetted surface area was reduced ~80 percent.

3. *Gray Slough*- This slough is located on private land in the North Santiam River drainage in Marion County. The landowners have proposed a gravel mining operation on their land and plan to enhance and create additional habitat for Oregon chub on the site. Oregon chub, threespine sticklebacks, sculpins, cutthroat trout, redlegged frogs, northwest salamanders, western pond turtles, and roughskin newts have been collected from the slough. Only a handful of chub were collected in 1995 (n=2), 1996 (n=3), 1997 (n=2), 1999 (n=13), and 2000 (n=4). No non-native fish or amphibians have been collected. The site has high quality Oregon chub habitat (abundant aquatic vegetation, depositional substrate, negligible

flow, depth 0.4-1.5 meters). The habitat enhancement project is currently on hold, due to an illness of one of the landowners.

4. *South Fork McKenzie Ponds*- This site is located downstream of Cougar Reservoir on a side channel to the South Fork McKenzie River. The ponds are large and moderately deep (average depth- 1.5 meters). Habitat is suitable for Oregon chub (depositional substrate, abundant vegetation). A habitat enhancement project to create more shallow water habitat was completed in 2000. Speckled dace, sculpins, and cutthroat were collected in 1998. The site is located on U.S. Forest Service property. Since this site is outside of the "confirmed" historic range, an introduction would not occur until a "Safe Harbor Agreement" is approved.

5. *Magne Pond*- This site is located on private property in the McKenzie River drainage. The pond is located on a small unnamed tributary and is approximately 75 meters by 20 meters, with a maximum depth of ~2.5 meters (range 0.1-2.5). Aquatic vegetation is abundant and the substrate is depositional. Cutthroat trout were the only fish species collected from the pond. Since this site is outside of the "confirmed" historic range, an introduction would not occur until a "Safe Harbor Agreement" is approved.

6. *South-Dunlin-Woodduck Ponds*- This site is located on Ankeny National Wildlife Refuge in Marion County. The site was first sampled in 1991. Originally, the habitat was marginally suitable for Oregon chub, due to a lack of aquatic vegetation. A major habitat enhancement project was completed in 1998. The site was first drained to remove non-native fish. Then, the site was recontoured, deepened, and a new dike and water control structure were constructed. The enhancement project created abundant shallow water vegetated habitat. The dike reconstruction and water control structure should prevent invasion by non-native fish. Summer water levels were low in 1999 and little new habitat, nor additional aquatic vegetation, was available for fish in late summer and fall. No fish were collected. The site was dry when visited in October 2000. An additional source of water (wells, diversion) is needed to make this site suitability for Oregon chub.

7. *Russell Pond*- This site is located on private property in the McKenzie River (Mohawk River) drainage. A small farm pond (~800 square meters) has suitable habitat for Oregon chub. No fish were collected in 2000. A temperature monitor was deployed in 1999-2000 and temperatures were suitable for Oregon chub. The landowner is considering a habitat enhancement project to create additional habitat for Oregon chub. Since this site is outside of the "confirmed" historic range, an introduction would not occur until a "Safe Harbor Agreement" is approved.

8. *Long Tom Ranch*- This site is located near the confluence of Amazon Creek and the Long Tom River. A large wetland restoration project was completed in 1999. Partners for Wildlife funds were used to create a large pond for Oregon chub. The pond was monitored in 2000; aquatic vegetation was sparse. The site will continue to be monitored in the future to determine suitability for chub.

9. *Jamplaski Ponds*- This site is located in the Amazon Creek subbasin of the Long Tom River. A large wetland restoration project was completed in 2000. Construction was not completed when the site was visited in 2000. The site will be monitored in the future.

Evaluating the Impacts of Activities Affecting Oregon Chub

Several activities that affected or had the potential to affect Oregon chub populations and/or their habitat were monitored in 2000. Activities included wetland mitigation and a diesel spill at Geren Island, potential expansion of a gravel mining operation at Windsor Island, bridge replacement on Highway 58, impacts of land application of biosolids near Oakridge Slough, and replacement of an irrigation structure in the Long Tom drainage.

We continued to monitor the effects of construction (expansion) at the Geren Island water treatment facility on Oregon chub and their habitat. In 1997, the City of Salem began an expansion project at their Geren Island Water Treatment Facility. The City agreed to set aside refuge areas (North Pond and North Channel) and to develop protection protocols for Oregon chub on the island. A wetland enhancement (mitigation) project on the North Pond was initiated in October 1997. The habitat enhancement project was designed to create additional shallow shoreline habitat in the pond. The northwest shoreline of the pond was graded to remove blackberries and create a shallow bench with a gradually sloping shoreline. Native riparian vegetation was planted. Survival of the planted vegetation was very low. Most of the woody species were either damaged by beavers or died due to a lack of water during the summer. The site was replanted with additional riparian trees and shrubs in 1999 and seedlings were protected by chicken wire and plastic mesh. Survival of replanted terrestrial vegetation was much better than the first attempt. Large woody debris was placed in the pond in 1999 to provide cover for fish. Survival of the original plantings of aquatic vegetation was also negligible. Additional aquatic vegetation was planted in 2000, yet survival appeared to be minimal. Currently, the mitigation project has not provided benefit for Oregon chub.

In July 2000, an accident occurred during construction of new filters at Geren Island. A contruction worker drove a large forklift into the North Channel. Diesel fuel and hydraulic fluid spilled onto riparian vegetation and some entered the pond. An environmental cleanup proceeded quickly and a disaster was averted. Concrete jersey barriers were placed between the road and channel to reduce the risk of another accident of this type.

We sampled the site of a proposed expansion of a gravel mining operation, near Windsor Island (WIND1-3, CLAG1) in the Mid-Willamette River drainage, for the presence of Oregon chub. The slough was extensive and complex. The habitat was high quality. No Oregon chub were collected. Native fish species present included native chiselmouth, sculpin, threespine stickleback, speckled dace, northern pikeminnow, juvenile chinook salmon. Non-native western mosquitofish, bluegill, brown bullhead, largemouth bass, and white crappie were also collected.

The Oregon Department of Transportation replaced a bridge on Highway 58 near Oakridge. Prior to construction, we sampled Barnard Slough (BARN1), a slough to the Middle Fork Willamette River near the bridge. Three Oregon chub were collected from the slough. Construction activities were modified to avoid impacts on the slough.

We raised concerns regarding the land application of municipal biosolids adjacent to Oakridge Slough and the potential impacts of this activity on Oregon chub. Several site visits and meetings occurred to discuss application timing, application rates, soil and hydraulic characteristics, etc. Soil depth, soil composition, and depth of the water table were tested by Oregon Department of Environmental Quality and found to be adequate. Biosolid application rates were found to be in excess of agronomic rates and will be reduced. Additional measures to reduce impacts on Oregon chub are being considered.

The U.S. Army Corps of Engineers replaced an irrigation dam on the Long Tom River south of Monroe, Oregon. Prior to construction, we sampled adjacent sloughs (STRODA1-5) for

the presence of Oregon chub. Sculpins were the only native fish collected. Non-native fish were abundant (western mosquitofish, bluegills, bullheads, largemouth bass).

Threats to Oregon Chub and Limitations to Their Recovery

Oregon chub continue to be impacted by human activities. During the past eight years, Oregon chub populations have been threatened by illegal water withdrawals, unauthorized fill and removal activities, timber harvest, highway and pipeline construction, roadside herbicide applications, chemical spills, and routine culvert cleaning operations. In addition, the proliferation of non-native fish continues to threaten Oregon chub populations. Non-native fish were collected from 21 of the 34 sites (62 percent) sampled for the first time in 2000 and 203 of the 479 sites (42 percent) sampled in the Willamette Valley since 1991. After the 1996 floods, non-native fish invaded several Oregon chub sites in the Santiam River drainage. Illegal planting of largemouth bass into an introduction site in the Middle Fork Willamette River drainage caused the collapse of a Oregon chub population that had once totaled >7,000 fish. Non-native fish are well established throughout the Willamette Valley. They threaten to invade sites containing Oregon chub populations and limit the ability of Oregon chub to migrate from existing sites and colonize suitable habitats elsewhere.

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APPENDIX A

Fish Species and Habitat Characteristics
at Each Survey Location

[1] Vegetation types are expressed as a percentage of the total surface area of the site. The sum of all vegetation types cannot exceed 100 percent.

[2] Vegetation Codes:

ACER	Big leaf maple (*Acer macrophyllum*)
ALIS	Water plantain (*Alisma* sp.)
ALNU	Alder (*Alnus* sp.)
AZOL	Water velvet (*Azolla* sp.)
CALI	Water starwort (*Callitriche* sp.)
CARE	Sedge (*Carex* sp.)
CERA	Coontail (*Ceratophyllum* sp.)
CHAR	Stonewort (*Chara* sp.)
DOWN	Box elengia (*Downingia elegans*)
ELAT	Waterwort (*Elatine* sp.)
ELEO	Spike rush (*Eleocharis* sp.)
ELOD	Waterweed (*Elodea* sp.)
FILA	Filamentous Algae
FONT	Water moss (*Fontinalis* sp.)
FRAX	Oregon ash (*Fraxinus latifolia*)
GRAM	Grasses (*Gramineae*)
IRIS	Yellow iris (*Iris pseudacorus*)
JUNC	Rush (*Juncas* sp.)
LEMN	Duckweed (*Lemna minor*)
LUDW	Water Purslane (*Ludwigia palustris*)
LYSI	Skunk cabbage (*Lysichiton americanum*)
MENT	Mint (*Mentha* sp.)
MYRI	Water milfoil (*Myriophyllum* sp.)
NONE	No aquatic vegetation
NUPH	Yellow water lily (*Nuphar* sp.)
OENA	Water celery (*Oenanthe* sp.)
POLY	Smartweed (*Polygonum* sp.)
POTA	Pondweed (*Potamogeton* sp.)
SALI	Willow (*Salix* sp.)
SAGI	Arrowhead (*Sagittaria* sp.)
SCIR	Bullrush (*Scirpus* sp.)
SCOT	Scot's broom (*Cytisus scoparius*)
SOLA	Nightshade (*Solanum ducamara*)
SPAR	Burr reed (*Sparganium* sp.)
TYPH	Cattail (*Typha* sp.)
VALI	Water celery (*Vallisneria* sp.)
VERO	Speedwell (*Veronica* sp.)

[3]Salmonid Codes: CH = chinook salmon; CO = coho salmon; CT = cutthroat trout; RB = rainbow trout.

[4]Centrarchid Codes: BG = bluegill; LB = largemouth bass; PK = pumpkinseed; C = crappie.

SANTIAM RIVER BASIN

Site Name **FOSTER PULLOUT POND**

Map Code **FOS2E**

Basin SANTIAM RIVER
Subbasin MIDDLE SANTIAM

Sample Date 05/22/00
Location T13S-R1E-24SW

Surface Area	2405 m^2
Average Depth	1.1 m
Water Temperature	13.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	60%
Emergent	40%
Floating	0%
Algae	0%
TOTAL	100%

Aquatic vegetation genera[2]

GRAM	10%
SALI	10
JUNC	3
ELEO	2
SPAR	35
POTA	30
ELOD	10

Native Fish Species Collected:

Oregon chub	2
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

Site Name **FOSTER PULLOUT POND**

Map Code **FOS2F***

Basin SANTIAM RIVER
Subbasin MIDDLE SANTIAM

Sample Date 09/28/00
Location T13S-R1E-24SW

Surface Area	2405 m^2
Average Depth	1.0 m
Water Temperature	12.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	0%
Emergent	80%
Floating	20%
Algae	0%
TOTAL	100%

Aquatic vegetation genera[2]

POTA	80%
SPAR	10
SALI	10

Native Fish Species Collected:

Oregon chub	80
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

SANTIAM RIVER BASIN

Site Name **GEREN ISLAND NORTH POND** Map Code **GER4E**

Basin SANTIAM RIVER
Subbasin NORTH SANTIAM

Sample Date 05/22/00
Location T9S-R1W-13NW

Surface Area	4469 m^2
Average Depth	1.2 m
Water Temperature	18.0 ^oC
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	25%
Emergent	33%
Floating	2%
Algae	0%
TOTAL	60%

Aquatic vegetation genera[2]

GRAM	25%
AZOL	2
JUNC	5
CARE	1
SALI	1
IRIS	1
ELOD	25

Native Fish Species Collected:

Oregon chub	199
Cottids	0
Dace	0
Redside shiners	437
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-BG	32
Bullheads	0
Carp	0

OTHER:

Site Name **GEREN ISLAND NORTH INTAKE CHNL** Map Code **GER6E**

Basin SANTIAM RIVER
Subbasin NORTH SANTIAM

Sample Date 05/22/00
Location T9S-R1W-13NW

Surface Area	20625 m^2
Average Depth	1.5 m
Water Temperature	11.0 ^oC
Percent Organic Substrate	95%

Types of Aquatic Vegetation[1]

Submergent	25%
Emergent	19%
Floating	1%
Algae	0%
TOTAL	45%

Aquatic vegetation genera[2]

MYRI	15%
ELOD	10
GRAM	15
ELEO	2
JUNC	2
LEMN	1

Native Fish Species Collected:

Oregon chub	155
Cottids	5
Dace	0
Redside shiners	3
Northern pikeminnow	1
Largescale suckers	1
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

SANTIAM RIVER BASIN

Site Name **GRAY SLOUGH** | Map Code **GRAY1E**

Basin SANTIAM RIVER | Sample Date 05/18/00
Subbasin NORTH SANTIAM | Location T9S-R1W-20NW

Surface Area	3240 m^2
Average Depth	0.6 m
Water Temperature	11.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	30%
Emergent	70%
Floating	0%
Algae	0%
TOTAL	100%

Aquatic vegetation genera[2]

GRAM	70%
CALI	10
SPAR	10
ELOD	5
FONT	5

Native Fish Species Collected:

Oregon chub	4
Cottids	4
Dace	194
Redside shiners	35
Northern pikeminnow	1
Largescale suckers	1
Sandrollers	0
Threespine sticklebacks	25
Salmonids-CH	1
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

Site Name **SANTIAM I-5 BACKWATER 1** | Map Code **I5BW1C**

Basin SANTIAM RIVER | Sample Date 04/26/00
Subbasin | Location T10S-R3W-3NW

Surface Area	620 m^2
Average Depth	1.5 m
Water Temperature	12.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	70%
Emergent	10%
Floating	0%
Algae	0%
TOTAL	80%

Aquatic vegetation genera[2]

GRAM	5%
SPAR	30
POTA	10
ELEO	5
ELOD	20
POLY	10

Native Fish Species Collected:

Oregon chub	5
Cottids	10
Dace	6
Redside shiners	58
Northern pikeminnow	142
Largescale suckers	32
Sandrollers	0
Threespine sticklebacks	40
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-BG	1
Bullheads	0
Carp	0

OTHER:

SANTIAM RIVER BASIN

Site Name **SANTIAM I-5 BACKWATER 2**

Map Code **I5BW2A**

Basin SANTIAM RIVER
Subbasin

Sample Date 04/26/00
Location T10S-R3W-3NW

Surface Area	2800 m^2
Average Depth	1.0 m
Water Temperature	12.0 °C
Percent Organic Substrate	50%

Types of Aquatic Vegetation[1]

Submergent	35%
Emergent	40%
Floating	0%
Algae	0%
TOTAL	75%

Aquatic vegetation genera[2]

GRAM	10%
ELEO	20
SPAR	10
SALI	10
POLY	25

Native Fish Species Collected:

Oregon chub	8
Cottids	2
Dace	2
Redside shiners	37
Northern pikeminnow	88
Largescale suckers	5
Sandrollers	0
Threespine sticklebacks	3
Salmonids-CH	1
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-BG	1
Bullheads	0
Carp	0

OTHER:

Site Name **MENEAR'S BEND**

Map Code **MENE1B**

Basin SANTIAM RIVER
Subbasin SOUTH SANTIAM

Sample Date 05/22/00
Location T13S-R2E-29S

Surface Area	1000 m^2
Average Depth	0.8 m
Water Temperature	14.5 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	25%
Emergent	11%
Floating	20%
Algae	0%
TOTAL	56%

Aquatic vegetation genera[2]

ACER	10%
GRAM	1
MENT	5
CALI	10
SPAR	10
LEMN	10
AZOL	10

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER: NO FISH

SANTIAM RIVER BASIN

Site Name **MARKS SLOUGH BEAVER POND MOUTH** Map Code **MKS3***

Basin SANTIAM RIVER
Subbasin SOUTH SANTIAM

Sample Date 10/12/00
Location T12S-R2W-1NW

Surface Area	2560 m^2
Average Depth	1.2 m
Water Temperature	12.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	60%
Emergent	35%
Floating	5%
Algae	0%
TOTAL	100%

Aquatic vegetation genera[2]

ELOD	10%
SPAR	20
MYRI	50
TYPH	10
LEMN	5
ELEO	2
GRAM	3

Native Fish Species Collected:

Oregon chub	0
Cottids	4
Dace	14
Redside shiners	0
Northern pikeminnow	3
Largescale suckers	3
Sandrollers	0
Threespine sticklebacks	2
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-LB	2
Bullheads	0
Carp	0

OTHER:

Site Name **GREEN'S BRIDGE BACKWATER** Map Code **NS14F**

Basin SANTIAM RIVER
Subbasin NORTH SANTIAM

Sample Date 04/25/00
Location T10S-R2W-7SE

Surface Area	2100 m^2
Average Depth	1.8 m
Water Temperature	12.0 °C
Percent Organic Substrate	95%

Types of Aquatic Vegetation[1]

Submergent	3%
Emergent	25%
Floating	0%
Algae	0%
TOTAL	28%

Aquatic vegetation genera[2]

GRAM	20%
ELOD	3
SALI	2
JUNC	1
ELEO	2

Native Fish Species Collected:

Oregon chub	0
Cottids	5
Dace	130
Redside shiners	92
Northern pikeminnow	32
Largescale suckers	3
Sandrollers	0
Threespine sticklebacks	23
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-LB PK	2
Bullheads	0
Carp	0

OTHER:

SANTIAM RIVER BASIN

Site Name **LOGAN SLOUGH**

Map Code **NS17A***

Basin SANTIAM RIVER
Subbasin NORTH SANTIAM

Sample Date 08/30/00
Location T9S-R2W-35SW

Surface Area	5400 m^2
Average Depth	1.0 m
Water Temperature	18.0 °C
Percent Organic Substrate	50%

Types of Aquatic Vegetation[1]

Submergent	10%
Emergent	13%
Floating	0%
Algae	0%
TOTAL	23%

Aquatic vegetation genera[2]

ELOD	10%
GRAM	5
ELEO	5
SPAR	1
SCIR	1
RANU	1

Native Fish Species Collected:

Oregon chub	0
Cottids	195
Dace	13
Redside shiners	7
Northern pikeminnow	1
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	115
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

Site Name **WISEMAN ISLAND BACKWATER**

Map Code **NS19A***

Basin SANTIAM RIVER
Subbasin NORTH SANTIAM

Sample Date 08/30/00
Location T10S-R2W-9C

Surface Area	600 m^2
Average Depth	0.6 m
Water Temperature	18.0 °C
Percent Organic Substrate	50%

Types of Aquatic Vegetation[1]

Submergent	20%
Emergent	7%
Floating	0%
Algae	0%
TOTAL	27%

Aquatic vegetation genera[2]

ELOD	20%
ELEO	5
RANU	2

Native Fish Species Collected:

Oregon chub	0
Cottids	40
Dace	12
Redside shiners	1
Northern pikeminnow	0
Largescale suckers	2
Sandrollers	0
Threespine sticklebacks	65
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

SANTIAM RIVER BASIN

Site Name **NORTH SANTIAM BACKWATER**

Map Code **NS21***

Basin SANTIAM RIVER
Subbasin NORTH SANTIAM

Sample Date 08/30/00
Location T10S-R3W-18SE

Surface Area	7500 m^2
Average Depth	1.3 m
Water Temperature	19.5 ^oC
Percent Organic Substrate	50%

Types of Aquatic Vegetation[1]

Submergent	45%
Emergent	20%
Floating	0%
Algae	0%
TOTAL	65%

Aquatic vegetation genera[2]

IRIS	10%
ELOD	40
SPAR	5
MYRI	5
RANU	5

Native Fish Species Collected:

Oregon chub	0
Cottids	45
Dace	11
Redside shiners	3
Northern pikeminnow	2
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	3
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	8
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

Site Name **NORTH SANTIAM BACKWATER**

Map Code **NS22***

Basin SANTIAM RIVER
Subbasin NORTH SANTIAM

Sample Date 08/30/00
Location T10S-R3W-13SE

Surface Area	2000 m^2
Average Depth	1.5 m
Water Temperature	22.0 ^oC
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	59%
Emergent	20%
Floating	0%
Algae	0%
TOTAL	79%

Aquatic vegetation genera[2]

ELOD	50%
SPAR	10
IRIS	10
POTA	2
MYRI	5
CALI	2

Native Fish Species Collected:

Oregon chub	0
Cottids	6
Dace	7
Redside shiners	3
Northern pikeminnow	3
Largescale suckers	8
Sandrollers	0
Threespine sticklebacks	22
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-LB	10
Bullheads	0
Carp	0

OTHER:

SANTIAM RIVER BASIN

Site Name **PIONEER PARK BACKWATER** Map Code **PION3C**

Basin SANTIAM RIVER
Subbasin NORTH SANTIAM

Sample Date 05/18/00
Location T9S-R1W-11SW

Surface Area	1500 m^2
Average Depth	1.0 m
Water Temperature	10.5 °C
Percent Organic Substrate	75%

Types of Aquatic Vegetation[1]

Submergent	15%
Emergent	10%
Floating	0%
Algae	0%
TOTAL	25%

Aquatic vegetation genera[2]

ELOD	15%
GRAM	5
ELEO	5

Native Fish Species Collected:

Oregon chub	2
Cottids	1
Dace	0
Redside shiners	57
Northern pikeminnow	9
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-CO	1
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

Site Name **SANTIAM BACKWATER** Map Code **SANT5***

Basin SANTIAM RIVER
Subbasin

Sample Date 08/30/00
Location T10S-R3W-24NW

Surface Area	360 m^2
Average Depth	0.8 m
Water Temperature	20.0 °C
Percent Organic Substrate	75%

Types of Aquatic Vegetation[1]

Submergent	20%
Emergent	15%
Floating	0%
Algae	0%
TOTAL	35%

Aquatic vegetation genera[2]

CALI	10%
ELOD	10
RANU	10
SPAR	5

Native Fish Species Collected:

Oregon chub	0
Cottids	23
Dace	6
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	24
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

SANTIAM RIVER BASIN

Site Name **SANTIAM CONS. EASEMENT SCE1/4**

Map Code **SCE1-4C**

Basin SANTIAM RIVER
Subbasin NORTH SANTIAM

Sample Date 04/26/00
Location T10S-R2W-7SE

Surface Area	16300 m^2
Average Depth	1.0 m
Water Temperature	12.0 °C
Percent Organic Substrate	95%

Types of Aquatic Vegetation[1]

Submergent	81%
Emergent	2%
Floating	2%
Algae	0%
TOTAL	85%

Aquatic vegetation genera[2]

MYRI	60%
ELOD	15
POTA	2
GRAM	2
SPAR	4
LEMN	2

Native Fish Species Collected:

Oregon chub	1
Cottids	33
Dace	1
Redside shiners	6
Northern pikeminnow	17
Largescale suckers	6
Sandrollers	0
Threespine sticklebacks	9545
Salmonids-CH	1
Pacific lamprey	1

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	1
Carp	0

OTHER:

Site Name **SANTIAM CONS. EASEMENT SCE7**

Map Code **SCE7E**

Basin SANTIAM RIVER
Subbasin NORTH SANTIAM

Sample Date 04/27/00
Location T10S-R3W-24NE

Surface Area	4000 m^2
Average Depth	1.2 m
Water Temperature	12.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	78%
Emergent	5%
Floating	3%
Algae	10%
TOTAL	96%

Aquatic vegetation genera[2]

ELOD	70%
IRIS	5
SPAR	6
POTA	2
FILA	10
LEMN	3

Native Fish Species Collected:

Oregon chub	3
Cottids	14
Dace	3
Redside shiners	21
Northern pikeminnow	2
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	14
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-PK	1
Bullheads	0
Carp	0

OTHER:

SANTIAM RIVER BASIN

Site Name **SANTIAM PUBLIC WORKS POND** | Map Code **SPWP1B**

Basin SANTIAM RIVER | Sample Date 04/27/00
Subbasin NORTH SANTIAM | Location T9S-R1W-15NE

Surface Area	3000 m^2
Average Depth	1.5 m
Water Temperature	12.0 °C
Percent Organic Substrate	95%

Types of Aquatic Vegetation[1]

Submergent	97%
Emergent	3%
Floating	0%
Algae	0%
TOTAL	100%

Aquatic vegetation genera[2]

MYRI	80%
ELOD	10
POLY	5
CALI	2
JUNC	3

Native Fish Species Collected:

Oregon chub	3
Cottids	11
Dace	2
Redside shiners	26
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	24
Centrarchids-	0
Bullheads	1
Carp	0

OTHER:

Site Name **SOUTH SANTIAM BACKWATER** | Map Code **SS1***

Basin SANTIAM RIVER | Sample Date 09/13/00
Subbasin SOUTH SANTIAM | Location T10S-R2W-33SE

Surface Area	1200 m^2
Average Depth	1.0 m
Water Temperature	17.5 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	47%
Emergent	15%
Floating	0%
Algae	0%
TOTAL	62%

Aquatic vegetation genera[2]

SPAR	15%
CALI	40
ELOD	5
POTA	2

Native Fish Species Collected:

Oregon chub	0
Cottids	80
Dace	22
Redside shiners	0
Northern pikeminnow	75
Largescale suckers	1
Sandrollers	0
Threespine sticklebacks	75
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	165
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

SANTIAM RIVER BASIN

Site Name **SOUTH SANTIAM BACKWATER** Map Code **SS2***

Basin SANTIAM RIVER
Subbasin SOUTH SANTIAM

Sample Date 09/13/00
Location T10S-R2W-33SW

Surface Area	3960 m^2
Average Depth	1.5 m
Water Temperature	19.0 °C
Percent Organic Substrate	60%

Types of Aquatic Vegetation[1]

Submergent	70%
Emergent	5%
Floating	0%
Algae	0%
TOTAL	75%

Aquatic vegetation genera[2]

ELOD	60%
ELEO	5
MYRI	5
CHAR	5

Native Fish Species Collected:

Oregon chub	0
Cottids	60
Dace	15
Redside shiners	15
Northern pikeminnow	115
Largescale suckers	5
Sandrollers	118
Threespine sticklebacks	2
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

Site Name **SOUTH SANTIAM BACKWATER** Map Code **SS3***

Basin SANTIAM RIVER
Subbasin SOUTH SANTIAM

Sample Date 09/13/00
Location T10S-R2W-33NW

Surface Area	480 m^2
Average Depth	0.6 m
Water Temperature	18.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	35%
Emergent	5%
Floating	5%
Algae	0%
TOTAL	45%

Aquatic vegetation genera[2]

AZOL	5%
ELOD	25
POLY	10
GRAM	5

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

SANTIAM RIVER BASIN

Site Name **SOUTH SANTIAM SIDE CHL BEAV PD**

Map Code **SS4***

Basin SANTIAM RIVER
Subbasin SOUTH SANTIAM

Sample Date 09/13/00
Location T10S-R2W-28SW

Surface Area	10400 m^2
Average Depth	1.0 m
Water Temperature	19.5 ^oC
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	40%
Emergent	20%
Floating	0%
Algae	0%
TOTAL	60%

Aquatic vegetation genera[2]

SPAR	20%
ELOD	30
MYRI	10

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	20
Centrarchids-LB BG	26
Bullheads	0
Carp	0

OTHER:

Site Name **SOUTH SANTIAM BACKWATER RT BK**

Map Code **SS5***

Basin SANTIAM RIVER
Subbasin SOUTH SANTIAM

Sample Date 09/13/00
Location T10S-R2W-30NW

Surface Area	1020 m^2
Average Depth	0.6 m
Water Temperature	19.0 ^oC
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	55%
Emergent	20%
Floating	0%
Algae	0%
TOTAL	75%

Aquatic vegetation genera[2]

ELOD	50%
POTA	20
MYRI	5

Native Fish Species Collected:

Oregon chub	0
Cottids	3
Dace	35
Redside shiners	7
Northern pikeminnow	90
Largescale suckers	30
Sandrollers	0
Threespine sticklebacks	20
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	12
Centrarchids-	0
Bullheads	1
Carp	0

OTHER:

SANTIAM RIVER BASIN

Site Name **SOUTH SANTIAM BACKWATER LF BK** Map Code **SS6***

Basin SANTIAM RIVER
Subbasin SOUTH SANTIAM

Sample Date 09/13/00
Location T10S-R3W-24NW

Surface Area	5400 m^2
Average Depth	1.0 m
Water Temperature	21.0 ^oC
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	60%
Emergent	15%
Floating	0%
Algae	0%
TOTAL	75%

Aquatic vegetation genera[2]

MYRI	50%
ELOD	10
GRAM	10
SPAR	5

Native Fish Species Collected:

Oregon chub	0
Cottids	22
Dace	22
Redside shiners	1
Northern pikeminnow	225
Largescale suckers	12
Sandrollers	0
Threespine sticklebacks	145
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	250
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

Site Name **SOUTH SANTIAM BACKWATER LF BK** Map Code **SS7***

Basin SANTIAM RIVER
Subbasin SOUTH SANTIAM

Sample Date 09/13/00
Location T10S-R3W-24NW

Surface Area	250 m^2
Average Depth	0.8 m
Water Temperature	21.0 ^oC
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	55%
Emergent	5%
Floating	5%
Algae	0%
TOTAL	65%

Aquatic vegetation genera[2]

POLY	5%
LEMN	5
SPAR	5
ELOD	50

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	3
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	5
Sandrollers	0
Threespine sticklebacks	140
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	107
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

SANTIAM RIVER BASIN

Site Name **SOUTH SANTIAM BACKWATER RT SS8**

Map Code **SS8***

Basin SANTIAM RIVER
Subbasin SOUTH SANTIAM

Sample Date 10/12/00
Location T12S-R2W-2SE

Surface Area	450 m^2
Average Depth	0.4 m
Water Temperature	12.0 ^oC
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	22%
Emergent	19%
Floating	0%
Algae	0%
TOTAL	41%

Aquatic vegetation genera[2]

SPAR	15%
ELEO	2
POTA	5
POLY	2
CALI	2
ELOD	15

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	3
Redside shiners	2
Northern pikeminnow	3
Largescale suckers	3
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	9
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

Site Name **SOUTH SANTIAM BACKWATER LF SS9**

Map Code **SS9***

Basin SANTIAM RIVER
Subbasin SOUTH SANTIAM

Sample Date 10/12/00
Location T11S-R2W-24S

Surface Area	500 m^2
Average Depth	0.7 m
Water Temperature	12.5 ^oC
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	50%
Emergent	30%
Floating	0%
Algae	0%
TOTAL	80%

Aquatic vegetation genera[2]

SPAR	25%
MYRI	50
TYPH	5

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	18
Redside shiners	9
Northern pikeminnow	2
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	18
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-BG	5
Bullheads	0
Carp	0

OTHER:

SANTIAM RIVER BASIN

Site Name **SOUTH SANTIAM BACKWATR LF SS10**

Map Code **SS10***

Basin SANTIAM RIVER
Subbasin SOUTH SANTIAM

Sample Date 10/12/00
Location T11S-R2W-23NE

Surface Area	1120 m^2
Average Depth	0.8 m
Water Temperature	12.5 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	50%
Emergent	30%
Floating	0%
Algae	0%
TOTAL	80%

Aquatic vegetation genera[2]

MYRI	50%
ELEO	5
SPAR	20
TYPH	5

Native Fish Species Collected:

Oregon chub	0
Cottids	4
Dace	12
Redside shiners	22
Northern pikeminnow	4
Largescale suckers	2
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-BG	4
Bullheads	0
Carp	0

OTHER:

Site Name **SOUTH SANTIAM BACKWATR RT SS11**

Map Code **SS11***

Basin SANTIAM RIVER
Subbasin SOUTH SANTIAM

Sample Date 10/12/00
Location T11S-R2W-14SE

Surface Area	1600 m^2
Average Depth	0.7 m
Water Temperature	12.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	45%
Emergent	20%
Floating	0%
Algae	0%
TOTAL	65%

Aquatic vegetation genera[2]

MYRI	25%
POTA	10
CALI	10
SPAR	20

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	22
Redside shiners	0
Northern pikeminnow	8
Largescale suckers	3
Sandrollers	0
Threespine sticklebacks	75
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

SANTIAM RIVER BASIN

Site Name **SOUTH SANTIAM BACKWATR LF SS12**

Map Code **SS12***

Basin SANTIAM RIVER
Subbasin SOUTH SANTIAM

Sample Date 10/12/00
Location T11S-R2W-14SW

Surface Area	2500 m^2
Average Depth	2.0 m
Water Temperature	12.5 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	5%
Emergent	25%
Floating	0%
Algae	0%
TOTAL	30%

Aquatic vegetation genera[2]

SPAR	20%
GRAM	5
CALI	5

Native Fish Species Collected:

Oregon chub	0
Cottids	2
Dace	2
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	58
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	130
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

Site Name **SOUTH SANTIAM BACKWATR RT SS13**

Map Code **SS13***

Basin SANTIAM RIVER
Subbasin SOUTH SANTIAM

Sample Date 10/12/00
Location T11S-R2W-14W

Surface Area	2800 m^2
Average Depth	2.0 m
Water Temperature	14.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	75%
Emergent	12%
Floating	0%
Algae	0%
TOTAL	87%

Aquatic vegetation genera[2]

SPAR	10%
IRIS	2
ELOD	65
POTA	10

Native Fish Species Collected:

Oregon chub	0
Cottids	3
Dace	32
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	2
Sandrollers	0
Threespine sticklebacks	78
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

Site Name **SOUTH SANTIAM BACKWATR RT SS14** Map Code **SS14***

Basin SANTIAM RIVER
Subbasin SOUTH SANTIAM

Sample Date 10/12/00
Location T11S-R2W-14NW

Surface Area	1320 m^2
Average Depth	1.5 m
Water Temperature	13.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	80%
Emergent	10%
Floating	0%
Algae	0%
TOTAL	90%

Aquatic vegetation genera[2]

MYRI	40%
POTA	30
POLY	10
ELOD	10

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	0
Redside shiners	2
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	107
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	23
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

Site Name **SOUTH SANTIAM BACKWATR RT SS15** Map Code **SS15***

Basin SANTIAM RIVER
Subbasin SOUTH SANTIAM

Sample Date 10/12/00
Location T11S-R2W-15NE

Surface Area	1170 m^2
Average Depth	0.7 m
Water Temperature	13.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	70%
Emergent	20%
Floating	2%
Algae	0%
TOTAL	92%

Aquatic vegetation genera[2]

MYRI	20%
POTA	30
ELOD	20
POLY	10
ELEO	10
LEMN	2

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	10
Redside shiners	4
Northern pikeminnow	78
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	9
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	2
Centrarchids-BG	32
Bullheads	0
Carp	0

OTHER:

MID-WILLAMETTE RIVER BASIN

Site Name **CLAGGETT CREEK**

Map Code **CLAG1**

Basin MID-WILLAMETTE RIVER
Subbasin

Sample Date 04/17/00
Location T6S-R3W-22NW

Surface Area	2400 m^2
Average Depth	1.0 m
Water Temperature	13.0 °C
Percent Organic Substrate	90%

Types of Aquatic Vegetation[1]

Submergent	5%
Emergent	25%
Floating	0%
Algae	0%
TOTAL	30%

Aquatic vegetation genera[2]

GRAM	25%
ELOD	5

Native Fish Species Collected:

Oregon chub	0
Cottids	4
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	5
Centrarchids-BG	3
Bullheads	1
Carp	0

OTHER: CHISELMOUT

Site Name **DUNN WETLAND POND DUNN2**

Map Code **DUNN2G***

Basin MID-WILLAMETTE RIVER
Subbasin BEAVER CREEK

Sample Date 09/28/00
Location T13S-R6W-11SE

Surface Area	2240 m^2
Average Depth	0.9 m
Water Temperature	22.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	15%
Emergent	75%
Floating	0%
Algae	0%
TOTAL	90%

Aquatic vegetation genera[2]

POTA	15%
SPAR	25
TYPH	40
ELEO	10

Native Fish Species Collected:

Oregon chub	6424
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

MID-WILLAMETTE RIVER BASIN

Site Name **DUNN WETLAND POND DUNN6**

Map Code **DUNN6B***

Basin MID-WILLAMETTE RIVER
Subbasin BEAVER CREEK

Sample Date 10/02/00
Location T13S-R6W-11SE

Surface Area	3500 m^2
Average Depth	1.0 m
Water Temperature	21.0 ^oC
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	40%
Emergent	60%
Floating	0%
Algae	0%
TOTAL	100%

Aquatic vegetation genera[2]

TYPH	25%
SPAR	25
POTA	20
ELEO	10
ELOD	20

Native Fish Species Collected:

Oregon chub	7662
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

Site Name **DUNN WETLAND POND DUNN7**

Map Code **DUNN7***

Basin MID-WILLAMETTE RIVER
Subbasin BEAVER CREEK

Sample Date 10/03/00
Location T13S-R6W-11SE

Surface Area	1225 m^2
Average Depth	0.5 m
Water Temperature	14.0 ^oC
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	2%
Emergent	14%
Floating	0%
Algae	0%
TOTAL	16%

Aquatic vegetation genera[2]

SPAR	2%
POTA	2
TYPH	2
ELEO	10

Native Fish Species Collected:

Oregon chub	22
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

MID-WILLAMETTE RIVER BASIN

Site Name **FINLEY NWR DISPLAY POND**

Map Code **FIN16H***

Basin MID-WILLAMETTE RIVER
Subbasin MUDDY CREEK

Sample Date 09/27/00
Location T13S-R5W-30SE

Surface Area	6400 m^2
Average Depth	1.5 m
Water Temperature	21.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	30%
Emergent	35%
Floating	0%
Algae	0%
TOTAL	65%

Aquatic vegetation genera[2]

MYRI	10%
ELEO	10
POTA	20
GRAM	10
TYPH	10
SPAR	5

Native Fish Species Collected:

Oregon chub	1749
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

Site Name **FINLEY BEAVER POND**

Map Code **FIN1E**

Basin MID-WILLAMETTE RIVER
Subbasin MUDDY CREEK

Sample Date 04/20/00
Location T13S-R5W-32NW

Surface Area	6000 m^2
Average Depth	1.1 m
Water Temperature	12.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	42%
Emergent	55%
Floating	0%
Algae	0%
TOTAL	97%

Aquatic vegetation genera[2]

SPAR	25%
ELEO	50
ELOD	10
GRAM	5
CERA	4
POLY	1
SPAR	2

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	4
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	9
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

MID-WILLAMETTE RIVER BASIN

Site Name **FINLEY LOWR GRAY CK-DS CATTAIL**

Map Code **FIN24A**

Basin MID-WILLAMETTE RIVER
Subbasin MUDDY CREEK

Sample Date 04/24/00
Location T13S-R5W-32NW

Surface Area	2700 m^2
Average Depth	0.8 m
Water Temperature	13.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	26%
Emergent	20%
Floating	0%
Algae	0%
TOTAL	46%

Aquatic vegetation genera[2]

GRAM	20%
CALI	20
SPAR	5
RANU	1

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	8
Centrarchids-BG	2
Bullheads	1
Carp	0

OTHER:

Site Name **FINLEY GRAY CREEK SWAMP**

Map Code **FIN4G**

Basin MID-WILLAMETTE RIVER
Subbasin MUDDY CREEK

Sample Date 04/20/00
Location T13S-R5W-31

Surface Area	22872 m^2
Average Depth	1.0 m
Water Temperature	12.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	35%
Emergent	60%
Floating	0%
Algae	0%
TOTAL	95%

Aquatic vegetation genera[2]

POTA	55%
JUNC	5
CARE	5
TYPH	5
GRAM	15
SPAR	5
SALI	5

Native Fish Species Collected:

Oregon chub	730
Cottids	8
Dace	2096
Redside shiners	4086
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	3091
Salmonids-CT	1
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	2
Carp	0

OTHER:

MID-WILLAMETTE RIVER BASIN

Site Name **FINLEY CATTAIL POND**

Map Code **FIN7F**

Basin MID-WILLAMETTE RIVER
Subbasin MUDDY CREEK

Sample Date 04/24/00
Location T13S-R5W-32NW

Surface Area	9600 m^2
Average Depth	0.8 m
Water Temperature	13.0 °C
Percent Organic Substrate	10%

Types of Aquatic Vegetation[1]

Submergent	25%
Emergent	30%
Floating	0%
Algae	0%
TOTAL	55%

Aquatic vegetation genera[2]

ELEO	10%
POTA	10
TYPH	5
ELOD	5
SPAR	10
GRAM	10
JUNC	5

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	3
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	10
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	3
Centrarchids-BG	1
Bullheads	1
Carp	0

OTHER:

Site Name **WINDSOR SLOUGH**

Map Code **WIND1**

Basin MID-WILLAMETTE RIVER
Subbasin

Sample Date 04/17/00
Location T6S-R3W-9/16

Surface Area	80000 m^2
Average Depth	2.0 m
Water Temperature	13.0 °C
Percent Organic Substrate	90%

Types of Aquatic Vegetation[1]

Submergent	0%
Emergent	10%
Floating	0%
Algae	0%
TOTAL	10%

Aquatic vegetation genera[2]

GRAM	5%
FRAX	5

Native Fish Species Collected:

Oregon chub	0
Cottids	1
Dace	0
Redside shiners	0
Northern pikeminnow	1
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-C LB	2
Bullheads	0
Carp	0

OTHER: CHISELMOUT

MID-WILLAMETTE RIVER BASIN

Site Name **WINDSOR SLOUGH**

Map Code **WIND2**

Basin MID-WILLAMETTE RIVER
Subbasin

Sample Date 04/17/00
Location T6S-R3W-16SE

Surface Area	6000 m^2
Average Depth	1.5 m
Water Temperature	13.0 ^oC
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	0%
Emergent	10%
Floating	0%
Algae	0%
TOTAL	10%

Aquatic vegetation genera[2]

GRAM	5%
FRAX	5

Native Fish Species Collected:

Oregon chub	0
Cottids	4
Dace	0
Redside shiners	1
Northern pikeminnow	2
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	1
Salmonids-CH	1
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	2
Centrarchids-BG	2
Bullheads	0
Carp	0

OTHER: CHISELMOUT

Site Name **WINDSOR SLOUGH**

Map Code **WIND3**

Basin MID-WILLAMETTE RIVER
Subbasin

Sample Date 04/17/00
Location T6S-R3W-21N

Surface Area	10000 m^2
Average Depth	2.0 m
Water Temperature	13.0 ^oC
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	85%
Emergent	0%
Floating	0%
Algae	0%
TOTAL	85%

Aquatic vegetation genera[2]

LUDW	40%
POTA	20
CHAR	20
POLY	5

Native Fish Species Collected:

Oregon chub	0
Cottids	2
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	3
Centrarchids-BG LB	21
Bullheads	0
Carp	0

OTHER:

LONG TOM RIVER BASIN

Site Name **LONG TOM RANCH POND**

Map Code **LTR1***

Basin LONG TOM RIVER
Subbasin

Sample Date 10/11/00
Location T15S-R5W-35NW

Surface Area	1500 m^2
Average Depth	1.0 m
Water Temperature	20.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	3%
Emergent	0%
Floating	2%
Algae	80%
TOTAL	85%

Aquatic vegetation genera[2]

LEMN	2%
POTA	3
FILA	80

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-RB	1
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

Site Name **STRODA SLOUGH 1**

Map Code **STRODA1**

Basin LONG TOM RIVER
Subbasin

Sample Date 05/23/00
Location T15S-R5W-10SW

Surface Area	30000 m^2
Average Depth	1.5 m
Water Temperature	20.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	5%
Emergent	0%
Floating	0%
Algae	0%
TOTAL	95%

Aquatic vegetation genera[2]

SPAR	10%
POLY	10
CHAR	45
POTA	25
ELOD	5
GRAM	5

Native Fish Species Collected:

Oregon chub	0
Cottids	1
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	100
Centrarchids-BG	50
Bullheads	2
Carp	0

OTHER:

Site Name **STRODA SLOUGH 2**

Map Code **STRODA2**

Basin LONG TOM RIVER
Subbasin

Sample Date 05/23/00
Location T15S-R5W-15NW

Surface Area	22750 m^2
Average Depth	1.5 m
Water Temperature	21.0 ^oC
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	90%
Emergent	5%
Floating	0%
Algae	0%
TOTAL	95%

Aquatic vegetation genera[2]

SPAR	10%
POLY	5
POTA	25
CHAR	50
GRAM	5

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	100
Centrarchids-BG	50
Bullheads	0
Carp	0

OTHER:

Site Name **STRODA SLOUGH 3**

Map Code **STRODA3**

Basin LONG TOM RIVER
Subbasin

Sample Date 05/23/00
Location T15S-R5W-15W

Surface Area	30625 m^2
Average Depth	1.2 m
Water Temperature	20.5 ^oC
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	95%
Emergent	5%
Floating	0%
Algae	0%
TOTAL	100%

Aquatic vegetation genera[2]

POLY	10%
GRAM	5
CHAR	65
POTA	20

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	70
Centrarchids-BG LB	102
Bullheads	0
Carp	0

OTHER:

LONG TOM RIVER BASIN

Site Name **STRODA SLOUGH 4**

Map Code **STRODA4**

Basin LONG TOM RIVER
Subbasin

Sample Date 05/23/00
Location T15S-R5W-10SW

Surface Area	17500 m^2
Average Depth	1.4 m
Water Temperature	21.0 ^oC
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	90%
Emergent	10%
Floating	0%
Algae	0%
TOTAL	100%

Aquatic vegetation genera[2]

POTA	25%
CHAR	50
GRAM	5
POLY	10
TYPH	5
ELOD	5

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-BG LB	51
Bullheads	1
Carp	0

OTHER:

Site Name **STRODA SLOUGH 5**

Map Code **STRODA5**

Basin LONG TOM RIVER
Subbasin

Sample Date 05/23/00
Location T15S-R5W-15N

Surface Area	15000 m^2
Average Depth	1.2 m
Water Temperature	21.0 ^oC
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	95%
Emergent	0%
Floating	0%
Algae	0%
TOTAL	95%

Aquatic vegetation genera[2]

CHAR	50%
POTA	30
SPAR	10
POLY	5

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	25
Centrarchids-BG	25
Bullheads	0
Carp	0

OTHER:

MCKENZIE RIVER BASIN

Site Name **RUSSELL BARN POND**

Map Code **RUSS1A***

Basin MCKENZIE RIVER
Subbasin MOHAWK RIVER

Sample Date 10/11/00
Location T15S-R1W-28SE

Surface Area	800 m^2
Average Depth	1.8 m
Water Temperature	10.0 ^{o}C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	25%
Emergent	15%
Floating	0%
Algae	0%
TOTAL	40%

Aquatic vegetation genera[2]

RANU	15%
SALI	10
MYRI	10
SPAR	5

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER: NO FISH

COAST FORK WILLAMETTE RIVER BASIN

Site Name **CAMAS SWALE** | Map Code **CS1E**

Basin COAST FORK WILLAMETTE RIVER | Sample Date 05/17/00
Subbasin CAMAS SWALE | Location T19S-R3W-8SE

Surface Area	275 m^2
Average Depth	1.2 m
Water Temperature	15.0 °C
Percent Organic Substrate	80%

Types of Aquatic Vegetation[1]

Submergent	0%
Emergent	5%
Floating	0%
Algae	0%
TOTAL	5%

Aquatic vegetation genera[2]

GRAM	5%

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	2
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-BG	1
Bullheads	0
Carp	0

OTHER:

Site Name **LAYNG CREEK POND** | Map Code **LAYNG1***

Basin COAST FORK WILLAMETTE RIVER | Sample Date 09/26/00
Subbasin LAYNG CREEK | Location T21S-R1E-22W

Surface Area	2700 m^2
Average Depth	1.0 m
Water Temperature	14.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	25%
Emergent	68%
Floating	5%
Algae	0%
TOTAL	98%

Aquatic vegetation genera[2]

TYPH	30%
SPAR	25
LEMN	5
SCIR	5
POTA	25
SALI	3
JUNC	5

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER: NO FISH

MIDDLE FORK WILLAMETTE RIVER BASIN

Site Name **BARNARD BRIDGE SLOUGH**

Map Code **BARN1**

Basin MIDDLE FORK WILLAMETTE RIVER
Subbasin

Sample Date 05/02/00
Location T21S-R2E-13SE

Surface Area	980 m^2
Average Depth	0.8 m
Water Temperature	9.5 ^oC
Percent Organic Substrate	80%

Types of Aquatic Vegetation[1]

Submergent	40%
Emergent	45%
Floating	5%
Algae	0%
TOTAL	80%

Aquatic vegetation genera[2]

CALI	20%
OENT	10
GRAM	5
CARE	20
ELOD	20
LEMN	5

Native Fish Species Collected:

Oregon chub	3
Cottids	1
Dace	3
Redside shiners	1
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-CT	4
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

Site Name **LOWER BUCKHEAD ENHANCEMENT PND**

Map Code **BCK14A***

Basin MIDDLE FORK WILLAMETTE RIVER
Subbasin BUCKHEAD CREEK

Sample Date 09/06/00
Location T20S-R2E-35NW

Surface Area	540 m^2
Average Depth	1.5 m
Water Temperature	16.0 ^oC
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	62%
Emergent	2%
Floating	0%
Algae	0%
TOTAL	64%

Aquatic vegetation genera[2]

ELOD	60%
CALI	2
SPAR	2

Native Fish Species Collected:

Oregon chub	1
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	1
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

MIDDLE FORK WILLAMETTE RIVER BASIN

Site Name **MIDDLE BUCKHEAD ENHANCEMENT PD** | Map Code **BCK15A***

Basin MIDDLE FORK WILLAMETTE RIVER | Sample Date 09/06/00
Subbasin BUCKHEAD CREEK | Location T20S-R2E-35NW

Surface Area	500 m^2
Average Depth	0.7 m
Water Temperature	19.0 °C
Percent Organic Substrate	90%

Types of Aquatic Vegetation[1]

Submergent	67%
Emergent	25%
Floating	5%
Algae	0%
TOTAL	97%

Aquatic vegetation genera[2]

ELOD	65%
SPAR	20
LEMN	5
GRAM	5
CALI	2

Native Fish Species Collected:

Oregon chub	3
Cottids	0
Dace	6
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

Site Name **LOWER BUCKHEAD ENHANCEMENT PND** | Map Code **BCK16A***

Basin MIDDLE FORK WILLAMETTE RIVER | Sample Date 09/06/00
Subbasin BUCKHEAD CREEK | Location T20S-R2E-35NW

Surface Area	630 m^2
Average Depth	1.0 m
Water Temperature	17.0 °C
Percent Organic Substrate	80%

Types of Aquatic Vegetation[1]

Submergent	2%
Emergent	7%
Floating	0%
Algae	0%
TOTAL	9%

Aquatic vegetation genera[2]

SPAR	5%
GRAM	2
CALI	2

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER: NO FISH

MIDDLE FORK WILLAMETTE RIVER BASIN

Site Name **MIDDLE BUCKHEAD CK BEAVER PNDS**

Map Code **BCK9-11B**

Basin MIDDLE FORK WILLAMETTE RIVER
Subbasin BUCKHEAD CREEK

Sample Date 05/16/00
Location T20S-R2E-36SW

Surface Area	9040 m^2
Average Depth	0.8 m
Water Temperature	13.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	70%
Emergent	20%
Floating	0%
Algae	0%
TOTAL	90%

Aquatic vegetation genera[2]

CARE	2%
POLY	10
CERA	50
CALI	5
GRAM	18
ELOD	5

Native Fish Species Collected:

Oregon chub	3573
Cottids	2
Dace	1766
Redside shiners	3585
Northern pikeminnow	10
Largescale suckers	6
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

Site Name **JASPER PARK SLOUGH**

Map Code **CAP1E**

Basin MIDDLE FORK WILLAMETTE RIVER
Subbasin

Sample Date 05/11/00
Location T18S-R2W-23SW

Surface Area	4000 m^2
Average Depth	1.5 m
Water Temperature	10.5 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	90%
Emergent	0%
Floating	5%
Algae	5%
TOTAL	100%

Aquatic vegetation genera[2]

ELOD	60%
SPAR	10
CHAR	20
LEMN	5
FILA	5

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	48
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	7
Centrarchids-LB	1
Bullheads	0
Carp	0

OTHER:

MIDDLE FORK WILLAMETTE RIVER BASIN

Site Name **DEXTER WEST ALCOVE**

Map Code **DEX1D**

Basin MIDDLE FORK WILLAMETTE RIVER
Subbasin

Sample Date 05/03/00
Location T19S-R1W-23NE

Surface Area	200 m^2
Average Depth	0.7 m
Water Temperature	10.5 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	15%
Emergent	15%
Floating	0%
Algae	0%
TOTAL	30%

Aquatic vegetation genera[2]

SYMP	10%
ELOD	15
SPAR	5

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER: NO FISH

Site Name **DEXTER ALCOVE "RV"**

Map Code **DEX3F***

Basin MIDDLE FORK WILLAMETTE RIVER
Subbasin

Sample Date 09/20/00
Location T19S-R1E-16SE

Surface Area	1080 m^2
Average Depth	0.6 m
Water Temperature	17.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	63%
Emergent	20%
Floating	0%
Algae	0%
TOTAL	83%

Aquatic vegetation genera[2]

POTA	10%
MYRI	50
GRAM	10
ELEO	5
POLY	3
SCIR	5

Native Fish Species Collected:

Oregon chub	876
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	2
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

MIDDLE FORK WILLAMETTE RIVER BASIN

Site Name **ELIJAH BRISTOW BEAVER POND**

Basin MIDDLE FORK WILLAMETTE RIVER
Subbasin ELIJAH BRISTOW

Surface Area 6991 m^2
Average Depth 1.1 m
Water Temperature 14.5 °C
Percent Organic Substrate 100%

Types of Aquatic Vegetation[1]

Submergent	95%
Emergent	3%
Floating	2%
Algae	0%
TOTAL	100%

Aquatic vegetation genera[2]

CALI	15%
ELOD	70
POLY	5
SPAR	5
GRAM	3
LEMN	2

Map Code **EB10G**

Sample Date 05/09/00
Location T19S-R1W-5SW

Native Fish Species Collected:

Oregon chub	1185
Cottids	0
Dace	17
Redside shiners	408
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	33
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-BG	1
Bullheads	0
Carp	0

OTHER:

Site Name **E.BRISTOW ST PK LGE GRAVEL PIT**

Basin MIDDLE FORK WILLAMETTE RIVER
Subbasin ELIJAH BRISTOW

Surface Area 2400 m^2
Average Depth 1.3 m
Water Temperature 16.0 °C
Percent Organic Substrate 70%

Types of Aquatic Vegetation[1]

Submergent	50%
Emergent	15%
Floating	0%
Algae	0%
TOTAL	65%

Aquatic vegetation genera[2]

MYRI	40%
GRAM	10
ELOD	10
JUNC	5

Map Code **EB13C***

Sample Date 09/25/00
Location T19S-R1W-5SW

Native Fish Species Collected:

Oregon chub	0
Cottids	1
Dace	6
Redside shiners	4
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	3
Centrarchids-BG	117
Bullheads	0
Carp	0

OTHER:

MIDDLE FORK WILLAMETTE RIVER BASIN

Site Name **E.BRISTOW ST PK SM GRAVEL PIT**
Map Code **EB15C***

Basin MIDDLE FORK WILLAMETTE RIVER
Subbasin ELIJAH BRISTOW
Sample Date 09/25/00
Location T19S-R1W-8NE

Surface Area	120 m^2
Average Depth	0.6 m
Water Temperature	11.0 °C
Percent Organic Substrate	90%

Types of Aquatic Vegetation[1]

Submergent	65%
Emergent	25%
Floating	10%
Algae	0%
TOTAL	100%

Aquatic vegetation genera[2]

LEMN	10%
MYRI	40
ELOD	20
SPAR	10
GRAM	15
CHAR	5

Native Fish Species Collected:

Oregon chub	0
Cottids	1
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

Site Name **ELIJAH BRISTOW NORTH SHORE BW**
Map Code **EBN1B**

Basin MIDDLE FORK WILLAMETTE RIVER
Subbasin ELIJAH BRISTOW
Sample Date 05/15/00
Location T19S-R1W-9N

Surface Area	1800 m^2
Average Depth	1.2 m
Water Temperature	11.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	55%
Emergent	10%
Floating	30%
Algae	0%
TOTAL	95%

Aquatic vegetation genera[2]

POTA	10%
NUPH	30
CHAR	10
POLY	5
GRAM	10
ELOD	20
CALI	10

Native Fish Species Collected:

Oregon chub	1170
Cottids	2
Dace	335
Redside shiners	95
Northern pikeminnow	2
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

MIDDLE FORK WILLAMETTE RIVER BASIN

Site Name **FALL CREEK SPILLWAY PONDS** | Map Code **FCSP1-2G***

Basin MIDDLE FORK WILLAMETTE RIVER | Sample Date 09/26/00
Subbasin FALL CREEK | Location T19S-R1W-15W

Surface Area	11329 m^2
Average Depth	1.2 m
Water Temperature	23.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	25%
Emergent	75%
Floating	0%
Algae	0%
TOTAL	100%

Aquatic vegetation genera[2]

POTA	5%
MYRI	20
SPAR	7
JUNC	15
ELEO	1
SALI	7
TYPH	45

Native Fish Species Collected:

Oregon chub	5034
Cottids	0
Dace	3094
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

Site Name **EAST FERRIN POND** | Map Code **FP3I**

Basin MIDDLE FORK WILLAMETTE RIVER | Sample Date 05/03/00
Subbasin FERRIN CREEK | Location T21S-R2E-13SE

Surface Area	17000 m^2
Average Depth	1.2 m
Water Temperature	14.5 °C
Percent Organic Substrate	95%

Types of Aquatic Vegetation[1]

Submergent	53%
Emergent	37%
Floating	4%
Algae	0%
TOTAL	94%

Aquatic vegetation genera[2]

TYPH	30%
POTA	50
SPAR	3
GRAM	5
NUPH	2
ELEO	2
LEMN	2

Native Fish Species Collected:

Oregon chub	0
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	10000
Centrarchids-LB	50
Bullheads	0
Carp	0

OTHER:

Site Name **EAST FERRIN POND** Map Code **FP3J***

Basin MIDDLE FORK WILLAMETTE RIVER Sample Date 09/07/00
Subbasin FERRIN CREEK Location T21S-R2E-13SE

Surface Area	17000 m^2
Average Depth	1.2 m
Water Temperature	14.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	20%
Emergent	42%
Floating	30%
Algae	0%
TOTAL	92%

Aquatic vegetation genera[2]

TYPH	30%
POTA	20
SPAR	5
GRAM	2
NUPH	5
AZOL	25
SCIR	5

Native Fish Species Collected:

Oregon chub	28
Cottids	0
Dace	0
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	10000
Centrarchids-LB	28
Bullheads	0
Carp	0

OTHER:

Site Name **HOSPITAL IMPOUNDMENT POND** Map Code **HI1G***

Basin MIDDLE FORK WILLAMETTE RIVER Sample Date 09/05/00
Subbasin Location T20S-R2W-20E

Surface Area	1768 m^2
Average Depth	1.5 m
Water Temperature	14.0 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	35%
Emergent	24%
Floating	0%
Algae	5%
TOTAL	64%

Aquatic vegetation genera[2]

MYRI	15%
GRAM	20
ELOD	20
FILA	5
SPAR	2
ELEO	2

Native Fish Species Collected:

Oregon chub	0
Cottids	104
Dace	1
Redside shiners	0
Northern pikeminnow	4
Largescale suckers	3
Sandrollers	0
Threespine sticklebacks	0
Salmonids-CH	1
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-LB	5
Bullheads	0
Carp	0

OTHER:

MIDDLE FORK WILLAMETTE RIVER BASIN

Site Name **HOSPITAL POND**

Map Code **HSP1H**

Basin MIDDLE FORK WILLAMETTE RIVER
Subbasin

Sample Date 05/01/00
Location T20S-R2E-21SW

Surface Area	4442 m^2
Average Depth	2.5 m
Water Temperature	10.5 ^oC
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	40%
Emergent	25%
Floating	5%
Algae	10%
TOTAL	80%

Aquatic vegetation genera[2]

GRAM	25%
ELOD	40
AZOL	5
FILA	10

Native Fish Species Collected:

Oregon chub	2976
Cottids	32
Dace	2
Redside shiners	975
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-CT	2
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

Site Name **EAST FORK MINNOW CREEK POND**

Map Code **MNW1I***

Basin MIDDLE FORK WILLAMETTE RIVER
Subbasin MINNOW CREEK

Sample Date 09/18/00
Location T19S-R1E-30NE

Surface Area	7122 m^2
Average Depth	0.8 m
Water Temperature	19.0 ^oC
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	5%
Emergent	95%
Floating	0%
Algae	0%
TOTAL	100%

Aquatic vegetation genera[2]

TYPH	25%
SPAR	40
SALI	20
SCIR	5
CALI	5
JUNC	5

Native Fish Species Collected:

Oregon chub	5051
Cottids	0
Dace	1871
Redside shiners	1458
Northern pikeminnow	2
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

MIDDLE FORK WILLAMETTE RIVER BASIN

Site Name **OAKRIDGE STP SLOUGH**

Map Code **OSTP1E**

Basin MIDDLE FORK WILLAMETTE RIVER
Subbasin

Sample Date 05/10/00
Location T21S-R3W-18SE

Surface Area	4800 m^2
Average Depth	1.0 m
Water Temperature	10.5 ^oC
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	15%
Emergent	25%
Floating	0%
Algae	0%
TOTAL	40%

Aquatic vegetation genera[2]

SPAR	5%
TYPH	5
CALI	10
SALI	5
JUNC	5
SCIR	5
GRAM	5

Native Fish Species Collected:

Oregon chub	140
Cottids	0
Dace	36
Redside shiners	42
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

Site Name **DEXTER ALCOVE "THE PIT"**

Map Code **PIT1H***

Basin MIDDLE FORK WILLAMETTE RIVER
Subbasin

Sample Date 09/19/00
Location T19S-R1W-14SW

Surface Area	494 m^2
Average Depth	0.6 m
Water Temperature	17.0 ^oC
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	35%
Emergent	29%
Floating	0%
Algae	0%
TOTAL	64%

Aquatic vegetation genera[2]

TYPH	25%
ELOD	35
GRAM	4

Native Fish Species Collected:

Oregon chub	1444
Cottids	1
Dace	0
Redside shiners	5
Northern pikeminnow	18
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

MIDDLE FORK WILLAMETTE RIVER BASIN

Site Name **RATTLESNAKE CREEK**

Map Code **RTC1C***

Basin MIDDLE FORK WILLAMETTE RIVER
Subbasin

Sample Date 10/11/00
Location T18S-R2W-26SE

Surface Area	1400 m^2
Average Depth	0.2 m
Water Temperature	13.0 °C
Percent Organic Substrate	50%

Types of Aquatic Vegetation[1]

Submergent	40%
Emergent	42%
Floating	10%
Algae	0%
TOTAL	92%

Aquatic vegetation genera[2]

GRAM	20%
SPAR	20
ELOD	40
LEMN	10
SCIR	2

Native Fish Species Collected:

Oregon chub	2
Cottids	4
Dace	7
Redside shiners	7
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	5
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	1
Carp	0

OTHER:

Site Name **SHADY DELL POND**

Map Code **SDP1I***

Basin MIDDLE FORK WILLAMETTE RIVER
Subbasin DELL CREEK

Sample Date 09/05/00
Location T20S-R2E-35NW

Surface Area	3200 m^2
Average Depth	0.9 m
Water Temperature	14.5 °C
Percent Organic Substrate	100%

Types of Aquatic Vegetation[1]

Submergent	5%
Emergent	27%
Floating	0%
Algae	0%
TOTAL	32%

Aquatic vegetation genera[2]

CARE	20%
SPAR	5
FONT	5
SALI	2

Native Fish Species Collected:

Oregon chub	3833
Cottids	1
Dace	648
Redside shiners	2900
Northern pikeminnow	4
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-CT	3
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

MIDDLE FORK WILLAMETTE RIVER BASIN

Site Name **WALLACE SLOUGH** Map Code **WALL1C**

Basin MIDDLE FORK WILLAMETTE RIVER Sample Date 05/23/00
Subbasin Location T18S-R2W-15SE

Surface Area	3600 m^2
Average Depth	1.7 m
Water Temperature	14.0 ^oC
Percent Organic Substrate	90%

Types of Aquatic Vegetation[1]

Submergent	25%
Emergent	17%
Floating	12%
Algae	0%
TOTAL	54%

Aquatic vegetation genera[2]

ELOD	20%
AZOL	12
CALI	5
OENT	2
CARE	10
GRAM	5

Native Fish Species Collected:

Oregon chub	0
Cottids	2
Dace	0
Redside shiners	12
Northern pikeminnow	2
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	55
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-BG	2
Bullheads	0
Carp	0

OTHER:

Site Name **WICOPEE POND** Map Code **WCP1I**

Basin MIDDLE FORK WILLAMETTE RIVER Sample Date 05/04/00
Subbasin SALT CREEK Location T21S-R4E-36SW

Surface Area	7700 m^2
Average Depth	1.8 m
Water Temperature	8.5 ^oC
Percent Organic Substrate	95%

Types of Aquatic Vegetation[1]

Submergent	25%
Emergent	65%
Floating	0%
Algae	0%
TOTAL	90%

Aquatic vegetation genera[2]

SALI	30%
SPAR	25
TYPH	20
CARE	10
ELEO	5

Native Fish Species Collected:

Oregon chub	2
Cottids	0
Dace	9
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-	0
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

MIDDLE FORK WILLAMETTE RIVER BASIN

Site Name	**WICOPEE POND**	Map Code	**WCP1J***
Basin	MIDDLE FORK WILLAMETTE RIVER	Sample Date	09/19/00
Subbasin	SALT CREEK	Location	T21S-R4E-36SW

Surface Area	3250 m^2
Average Depth	0.8 m
Water Temperature	17.0 ^{o}C
Percent Organic Substrate	90%

Types of Aquatic Vegetation[1]

Submergent	95%
Emergent	0%
Floating	0%
Algae	0%
TOTAL	95%

Aquatic vegetation genera[2]

SALI	30%
TYPH	30
SPAR	25
CARE	5
ELEO	5

Native Fish Species Collected:

Oregon chub	4576
Cottids	0
Dace	792
Redside shiners	0
Northern pikeminnow	0
Largescale suckers	0
Sandrollers	0
Threespine sticklebacks	0
Salmonids-CT	1
Pacific lamprey	0

Non-native Fish Species Collected:

Western Mosquitofish	0
Centrarchids-	0
Bullheads	0
Carp	0

OTHER:

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