

Appendix A. Investigation and Analysis Report

This Investigation and Analysis (I&A) Report complements the Lower Tillamook Bay Watershed Plan and Environmental Assessment. It addresses information required by Principles and Guidelines that supports the formulation, evaluation and conclusions of the watershed plan. Although it is not the intent of the I & A to repeat information in the watershed plan, some duplication is unavoidable.

Basic Watershed Setting and Inventory

The Tillamook Bay National Estuary Study and the various reports prepared for it were used to describe much of the watershed setting. This includes history, climate, hydrology, status of resources (fish, wildlife, water quality, etc.). Other documents such as the Total Daily Maximum Load conducted by the Oregon Department of Environmental Quality (ODEQ, 2001) and the Section 905(b) Analysis by the U.S. Army Corp of Engineers (USACE, 1998) were used to supplement information from the Estuary Study.

Data from the field office files on commercial dairy operations was used to summarize activities on those operations. The NRCS Oregon Animal Waste Management computer model was used to estimate adequacy of current storage facilities and determine acres required to apply collected wastes based on agronomic needs. The same model was used to estimate additional storage requirements.

Prior to this planning effort there was no comprehensive inventory of non-dairy livestock operations in the watershed. Many of these operations are small, non-commercial operations which neither NRCS nor the SWCD regularly work with. A visual survey was conducted to identify all of these operations and collect basic information such as size, number and type of livestock, pasture condition, livestock access to streams, waste storage facilities, etc. A copy of the Small Farm Inventory Form that was used for this survey appears at the end of this report.

Both farm inventories (NRCS field office records and small farm survey) were compared to the 1992 Census of Agriculture, which was itemized by zip code. The farm inventories reported 37 percent more farms and 53 percent more animal units than the Census. The percent distribution between commercial dairies and other livestock operations between the Census and the NRCS farm inventories were essentially the same (58% dairies and 43% other livestock). The Census and NRCS farm inventories reported similar distributions of livestock by type (dairy, beef, horse, etc.). This comparison indicates the physical and economic evaluations conducted in the watershed accurately accounted for all possible livestock operations.

Geographic Information System (GIS) data layers were gathered from the Tillamook Bay Resource Center (established as part of the TBNEP) and the Oregon GIS Data Center. Data layers collected and used in evaluations for this report included streams, roads, public land survey, ownership, land use, wetlands, basin and subwatershed boundaries, locations of culverts and tidegates, and existing dikes and levees. A digital map of the

100-year floodplain was obtained from the Federal Emergency Management Agency. A detailed riparian vegetation inventory was obtained from Oregon Department of Environmental Quality. The NRCS water resources staff, with assistance from the NRCS Resource Inventory Team, assembled GIS data into an ArcView project for evaluations and to produce maps for the report and public presentations.

Threatened and Endangered Species

Current listing of threatened and endangered species was obtained from the US Fish and Wildlife Service and National Marine Fisheries Service (see Section 1.13). It was decided NRCS's section 7 consultation responsibilities need to occur at the farm planning level for this project or at until NRCS obtains a programmatic consultation. Site specific situations make it difficult to conduct Section 7 consultations on a watershed protection plan such as this without knowing the details of the individual farm plans.

Cultural Resources

A search of the State Historic Preservation Office's files revealed seven sites within the watershed. As individual farm plans are developed, the NRCS Cultural Resource Specialist will be consulted for actions that constitute an "undertaking" as defined in NRCS GM 420 Part 401 Subpart D 401.40, 401.41 and 401.42.

Resource Problems

Six major resource concerns for the Lower Tillamook Bay Watershed were identified using the TBNEP (see Chapter 2 and 3). To address these resource concerns the PL-566 watershed plan relied on the NRCS Field Office Technical Guides to establish the basic resource management systems and effects (FOTG, Section III, 2001). The following sections outline the basic methodologies used to address the resource concerns.

Bacteria

Oregon Department of Environmental Quality has conducted a TMDL study on bacteria loading to Tillamook Bay. This information was used to establish current conditions and to identify water quality standards or load allocations agriculture will be required to address. The TMDL, however did not separate agriculture contributions into the various types of livestock operations found in the watershed. Dairies and small beef and horse operations have significantly different management practices, which affect their potential to contribute bacteria. An evaluation of livestock operations by type, soil and subwatershed was conducted using a bacterial-loading model (MWASTE) developed by Oregon State University (OSU, 1988). The model estimates bacterial loading from both land application of manure and direct deposition from grazing animals. The model was run to estimate current loading and anticipated loading based on the implementation of several alternative resource management systems.

Temperature

This plan relied on modeling conducted by the Oregon Department of Environmental Quality ODEQ for a temperature total maximum daily load (TMDL) on the five rivers in the watershed. Heat Source was the model used by ODEQ. Heat Source was originally developed by Matt Boyd as his graduate thesis (Boyd, 1996), who later refined it as an

employee for ODEQ. Heat Source is a mathematical model that describes the physical and thermodynamic processes inherent to streams and open channels. ODEQ developed databases on topography, vegetation and channel morphology for each of the rivers in the Tillamook Bay Watershed. Heat Source estimates the temperatures all along the stream network every 10 to 15 meters from the headwaters to the mouth. Simulations were made for current conditions and calibrated to measured stream temperatures. Stream temperature estimates were then made based on potential shading and changes in stream morphology (width to depth ratios). For this study changes in stream warming were compared for current and future conditions as water flowed from the upper-forested reaches through the lower-agricultural zone.

Nutrients

Nitrogen was the only nutrient assessed beyond the FOTG guidesheet level. The NLEAP model (Follett, et al., 1991) was used to estimate nitrogen losses. NLEAP was developed by the USDA Agricultural Research Service to estimate nitrate losses mainly due to leaching. The program also estimates losses due to runoff and erosion. The model was run for all livestock operations by type and subwatershed; for current conditions and future conditions. Future conditions were also modeled for several different resource management systems.

Sediment

Estimates of erosion and sediment came from the TBNEP which referenced an erosion and sediment study previously conducted by the U.S. Department of Agriculture (USDA, 1978). Those studies indicate that forestry activities have been the major source of sediment in the watershed. Within the agricultural zone, most erosion stems from streambanks. Based on the estimates of these studies of streambank erosion, reductions from riparian resource management systems were estimated by computing areas needing treatment from the GIS database as a percentage of a particular agricultural land use type (dairy or small farm).

Fisheries Habitat

Fish habitat suitability is very important due to the ESA listing of coho salmon, steelhead and cutthroat trout. Commercial and sport fishing for these and other anadromous salmonids is also very important to the local economy. A fish habitat index was developed for each species. These indices followed the methodology used in U. S. Fish and Wildlife habitat suitability indices but were modified to consider entire watersheds. A team of fisheries biologists from NRCS and Oregon Department of Fish & Wildlife worked together to develop the matrices. The indices considered major influencing factors (water quality, large woody debris, substrate composition, pool-riffle ratios, etc.); physiographic setting (upland, lowland and tidal tributaries and the mainstem); and function (spawning, rearing or migration). A sample coho index is attached to the end of this report.

Biologists used the index to estimate current habitat suitability and the future suitability expected after the implementation of this project. The future suitability assumes 40 to 50 years have transpired to allow riparian vegetation planted to mature.

Economic Analysis

The economic analysis was performed using the current discount rate of 6.375% for a 50-year evaluation period (Water Resource Development Act of 1974, Section 80, for current notice go to <http://www.usace.army.mil/inet/functions/cw/cecwp/egm01-02.pdf>). A longer than normal evaluation period was used so that benefits attributable to riparian restoration could be fully evaluated. All costs and benefits are expressed in current dollars (January 2001).

Cost estimates were based on the quantity of conservation practices and practice components that would be installed based on estimated participation rates. Social Science Technical Note 1801 (revised) was used to estimate participation rates for dairies, other livestock operations with more than five animal units and other livestock operations with less than five animal units. The number of participating farms was then multiplied by an average price-cost list to estimate total project costs (see appendix A). Project administration and technical assistance costs were estimated on a percentage basis but under the assumption that the field office will need about 1.5 to 2 additional employees to develop, write and maintain plans and long-term contracts.

An installation schedule was created under the assumption that plans and contracts would be initiated during the first five years of funding. The next five to 10 years would require staff time for follow-up and contract modifications when necessary.

Annual benefits were estimated for effects that could be reliably estimated. On-farm benefits were quantified for increased forage production, nutrient savings, reduced environmental penalties, and reduced labor and equipment costs. Off-site benefits for commercial oyster production and sport salmon and steelhead were also evaluated. Other possible benefits such as dairy herd health, aesthetics, recreational clamming and commercial salmon fisheries were not quantified.

An incremental analysis was performed on each resource management system by type of livestock operation. Those RMS combinations that produced positive net benefits were formulated into the National Economic Development Alternative. The Headquarters RMS as an individual increment did not produce positive benefits. The structural costs to build waste collection and storage facilities are significant compared to benefits that can be directly attributed to the headquarters land use itself. However, since water quality benefits realized on pasture/hayland could not be earned without adequate waste storage facilities on farm headquarters these two land uses were combined as one increment for alternative formulation. Done this way, all increments produce positive net benefits. Therefore, only one alternative, besides the no action alternative, was formulated.

Environmental Evaluation

The Oregon Environmental Evaluation and Resource Inventory Checklist (OR-EVT-1) was used to document the need for an environmental assessment. A copy of the completed OR-EVT-1 can be found on page 106. It was concluded this project would result in beneficial cumulative effects that warrant a complete environmental assessment.

Tillamook Bay Watershed – Small Farm Inventory Form

Date: _____ Completed by: _____ Farm Identifier: _____ Watershed: _____

1. Owner Name, address, location if known: _____
2. Property size (acres): _____ Property is on Floodplain Yes _____ No _____
3. Land use(s) by acres: Pasture _____ Dirt Paddock _____ Hayland _____ Cropland _____
Woodland _____ Other _____ If other describe: _____
4. Are there livestock? Yes _____ None visible _____ None present _____
If yes enter number and type: Dairy _____ Horse _____ Beef _____ Sheep _____
Other (no.) _____ If other describe _____
5. Slope of land used by livestock: Flat _____ Moderate _____ Steep _____
6. Condition of land used for grazing (don't include paddocks)? N/A _____ Good _____ Fair _____ Poor _____
7. Does a stream run through or adjacent to the property?
Through _____ Adjacent <100ft away _____ Adjacent 100-200ft away _____ No _____ Not sure _____
8. If Q7 is through or adjacent, is:
A. It perennial _____ intermittent _____ or N/A _____
B. Bank condition? N/A _____ Good _____ Fair _____ Poor _____
C. Canopy condition? N/A _____ Good _____ Fair _____ Poor _____
9. Does a ditch run through or adjacent to the property?
Through _____ Adjacent < 100 ft away _____ No _____ Not Sure _____
10. If livestock and stream or ditch, access type: N/A _____ Not sure _____ Uncontrolled access _____
Fenced, no access _____ Fenced, periodic access _____ Controlled access (i.e. stream crossing) _____
11. Distance from heavily used area to surface water?
N/A _____ <20ft. _____ 20-50ft. _____ 50-100ft. _____ > 100ft. _____
12. Do there appear to be wetlands on the property? Yes _____ No _____ Not sure _____
13. If Q12 yes, do livestock have access? N/A _____ Yes _____ No _____ Not sure _____
14. Facilities for pasture management (cross fencing)? Yes _____ No _____ Not sure _____
If yes, are they used to improved pasture condition? N/A _____ Yes _____ No _____
15. Manure storage facilities? Yes _____ No _____ Not sure _____
If yes, what type? N/A _____ Dry stack covered _____ Stack uncovered _____ Other _____
16. If pasture, are there also confinement facilities? Yes _____ No _____ Not sure _____
A. What type? N/A _____ Holding pens _____ Barn/shed _____ Other _____
B. Animal confined? N/A _____ Year round _____ Winter _____ Never/Seldom _____
17. Do buildings have a runoff system? N/A _____ Yes _____ No _____ Not sure _____
18. Nonpoint Pollution Rating? (1-5) _____

Small Farm Definitions

Farm number: Unique identifier that can be used to locate farm on a base map.

Soil: Note the predominate soil to which livestock have access. If more than one dominant soil, list in order of amount, greatest first.

Pasture condition:

- Good – good vigor, healthy, 67-100% usable forage, 2/3 to full potential
- Fair – fair vigor and health, 34-66% usable forage, 1/3 to 2/3 potential
- Poor – poor vigor and health, 1-33% usable forage, 1/3 of potential

Slope:

- Flat - 0 to 5% slope
- Moderate – 5 to 15% slope
- Steep – gt 15% slope

Stream bank condition:

- Good - > 75% cover of grass and low growing vegetation
- Fair – 50 to 75% vegetative cover, 10-25% exposed soil, no ruts
- Poor - <50% vegetative cover, >25% exposed soil, ruts and trails

Canopy condition:

- Good - >75% stream shaded by trees
- Fair – 25- 75% stream is shaded
- Poor - < 25% stream is shaded

Nonpoint Pollution Rating (1 to 5):

1 = Low potential, good condition pasture, low animal density (<1AU/acre), no water bodies in vicinity, low slopes

3 = Medium potential, fair condition pasture, 1 to 2 AU/acre, water bodies in vicinity but limited access or no evidence of use, moderate slopes

5 = High potential, poor condition pasture, over 2 AU/acre, access to water bodies, sloping land, evidence of contamination.

Note: Ratings of 2 or 4 signify farms with condition between those described above

Salmon Habitat Suitability Indices

| Analysis Area: TILLAMOOK WATERSHED | | | | | | |
|---|---------------------------|-----------|--------------------------|-------------|------|------|
| Cumulative Effects Issue: COHO - SUSTAINABLE POPULATION (INDEX) | | | | | | |
| Function | Physiographic Setting | | Influencing Factor | Index Value | | |
| (life stage) | | Weighting | | BM | RMS | CCMP |
| Spawning | Lowland-nontidal | 0.35 | substrate adequacy | 0.30 | 0.60 | 0.60 |
| | | | wq (temp, do, nutrients) | 0.60 | 0.80 | 0.80 |
| | | | riparian vegetation | 0.30 | 0.60 | 0.60 |
| | | | COMBINED = | 0.38 | 0.66 | 0.66 |
| | Mainstem | 0.15 | substrate adequacy | 0.25 | 0.30 | 0.35 |
| | | | wq (temp, do, nutrients) | 0.35 | 0.50 | 0.50 |
| | | | riparian vegetation | 0.20 | 0.60 | 0.60 |
| | | | COMBINED = | 0.26 | 0.45 | 0.47 |
| | Upland-forest | 0.5 | substrate adequacy | 0.60 | 0.65 | 0.65 |
| | | | wq (temp, do, nutrients) | 0.75 | 0.80 | 0.85 |
| | | | riparian vegetation | 0.60 | 0.65 | 0.70 |
| | | | COMBINED = | 0.65 | 0.70 | 0.73 |
| Rearing | Lowland-tidal | 0.05 | wq (temp, do, nutrients) | 0.25 | 0.60 | 0.70 |
| | | | %backwater unmodified | 0.20 | 0.50 | 0.55 |
| | | | large woody debris | 0.10 | 0.40 | 0.45 |
| | | | emergent vegetation | 0.05 | 0.35 | 0.35 |
| | | | riparian vegetation | 0.20 | 0.60 | 0.70 |
| | | | COMBINED = | 0.14 | 0.48 | 0.53 |
| | Lowland-nontidal | 0.35 | wq (temp, do, nutrients) | 0.20 | 0.55 | 0.60 |
| | | | %backwater unmodified | 0.20 | 0.30 | 0.40 |
| | | | large woody debris | 0.10 | 0.50 | 0.70 |
| | | | pools | 0.20 | 0.50 | 0.60 |
| | | | screens | 0.05 | 0.80 | 0.80 |
| | | | riparian vegetation | 0.30 | 0.60 | 0.75 |
| | | | substrate/riffle | 0.20 | 0.60 | 0.70 |
| | | | COMBINED = | 0.16 | 0.53 | 0.64 |
| | Mainstem | 0.20 | wq (temp, do, nutrients) | 0.20 | 0.50 | 0.60 |
| | | | %backwater unmodified | 0.20 | 0.25 | 0.30 |
| | | | large woody debris | 0.20 | 0.40 | 0.50 |
| | | | pools | 0.30 | 0.50 | 0.55 |
| | | | screens | 0.05 | 0.80 | 0.80 |
| | | | substrate/riffle | 0.30 | 0.50 | 0.55 |
| | riparian vegetation | 0.20 | 0.50 | 0.55 | | |
| | COMBINED = | 0.18 | 0.47 | 0.53 | | |
| | Upland-forest | 0.40 | wq (temp, do, nutrients) | 0.60 | 0.65 | 0.80 |
| | | | large woody debris | 0.40 | 0.45 | 0.70 |
| pools | | | 0.40 | 0.45 | 0.70 | |
| riparian vegetation | | | 0.60 | 0.65 | 0.80 | |
| substrate,riffles | | | 0.40 | 0.45 | 0.70 | |
| COMBINED = | | | 0.47 | 0.52 | 0.74 | |
| migration | Lowland-tidal | 0.05 | wq (temp, do, nutrients) | 0.40 | 0.70 | 0.75 |
| | | | barriers | 0.50 | 0.60 | 0.75 |
| | | | riparian vegetation | 0.20 | 0.60 | 0.60 |
| | | | COMBINED = | 0.34 | 0.63 | 0.70 |
| | Lowland-nontidal | 0.35 | wq (temp, do, nutrients) | 0.40 | 0.70 | 0.75 |
| | | | barriers | 0.30 | 0.60 | 0.75 |
| | | | pools | 0.20 | 0.40 | 0.60 |
| | | | riparian vegetation | 0.25 | 0.60 | 0.70 |
| | COMBINED = | 0.28 | 0.56 | 0.70 | | |
| | Mainstem | 0.20 | wq (temp, do, nutrients) | 0.50 | 0.60 | 0.70 |
| | | | barriers | 0.90 | 0.90 | 0.90 |
| | | | pools | 0.60 | 0.70 | 0.75 |
| | | | riparian vegetation | 0.20 | 0.60 | 0.60 |
| | COMBINED = | 0.48 | 0.69 | 0.73 | | |
| | Upland-forest | 0.40 | wq (temp, do, nutrients) | 0.75 | 0.80 | 0.85 |
| | | | barriers | 0.30 | 0.45 | 0.65 |
| | | | pools | 0.40 | 0.50 | 0.65 |
| | | | riparian vegetation | 0.60 | 0.65 | 0.70 |
| | COMBINED = | 0.48 | 0.58 | 0.71 | | |
| | Proposed Action Scenario: | Index | | | | |
| BM = | 0.39 | | | | | |
| RMS = | 0.58 | | | | | |
| CCMP = | 0.67 | | | | | |

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| USDA -NRCS-OREGON Environmental Evaluation And Resource Inventory Checklist | Client/Project Name; <u>Lower Tillamook Bay Watershed Plan and EA</u> County: <u>Tillamook, Oregon</u> Planning Units: <u>1710020307, 1710020306, 1710020305, 1710020304, 1710020303</u> Technician: <u>Terry Nelson</u> Date: <u>03/01/2001</u> Notes: <u>This environmental evaluation considers cumulative effects of all agricultural operations on the watershed not effects on individual farms.</u> |
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Purpose and Need (problem) of Action: This is a plan to improve water quality and fishery habitat within the Lower Tillamook Bay Watershed while improving the economic sustainability of the dairy industry. This plan will help the agricultural community meet the requirements under the Clean Water Act and the Endangered Species Act.

Purpose: This form provides summary documentation for environmental evaluation of benchmark conditions and planned actions.

Environmental Evaluation: (EE) NRCS begins its National Environmental Policy Act (NEPA) responsibility by documenting an EE using the "Environmental Evaluation and Resource Inventory Checklist". An EE will be conducted during all NRCS assisted conservation planning activities. The EE documents the analysis of SWAPA+H resource concerns and an evaluation of effects on special environmental policies and regulations. The EE uses and depends upon the interdisciplinary planning approach and will assist, early on, with the development of alternatives that will avoid, minimize, or mitigate the effects of adverse impacts. The EE indicates whether the proposed action may have a significant effect on the quality of the human environment and if further analysis is needed.

Instructions: For each landuse in the planning unit place the landuse code in one of the landuse blocks. Identify resource concerns by putting a check mark in the appropriate landuse column. Identify if quality criteria for each resource concern are met for Benchmark conditions by placing a check mark in the appropriate block. Following the selection of the preferred alternative place a check mark in the appropriate block in the *Planned* column indicating if Quality Criteria is met. Alternatives evaluated and selected, and documentation of Special Environmental Concerns should be attached to the OR-EVT-1

Land Use Designations: C-Crop, F-Forest, GF-Grazed Forest, GR-Grazed Range, H/P-Hay & Pasture, H-Headquarters, M-Mined, N-Native Pasture, NA-Natural Area, R-Recreation, U-Urban, W-Water, WP-Watershed Protection, WL-Wildlife

Landowner's Designated Use: Symbol WET, Use Wetland, Symbol _____, Use _____.

| RESOURCE CONCERNS | LAND USE | | | | | NOTES | MEETS QUALITY CRITERIA | | | |
|---------------------------|----------|-----|---------|----|-----|--|------------------------|----|-----|---|
| | Bch | | Planned | | Bch | | Planned | | | |
| | H | H/P | WL | WE | T | NO | YES | NO | YES | |
| SOIL EROSION | | | | | | | | | | |
| Sheet and Rill Erosion | | X | X | | | Sheet and Rill erosion is insignificant. | | X | | X |
| Wind Erosion | | | | | | Not Applicable | | | | |
| Concentrated Flow Erosion | | X | X | | | Concentrated flow erosion is insignificant. | | X | | X |
| Classic Gully Erosion | | | | | | Not Applicable | | | | |
| Streambank Erosion | | | X | | | Streambank erosion does occur within some pastures where livestock currently have access to stream banks. High flows and gravel accumulations also have aggravated streambank erosion in some locations. | X | | | X |
| Irrigation Induced | | | | | | Not Applicable | | | | |
| Soil Mass Movement | | | | | | Not Applicable | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|--|--|---|---|--|---|
| Roadbanks, Construction sites & Scour Areas | X | | | | | On some livestock operations, erosion from walkways and heavy use areas may occur but not considered significant cumulatively for watershed. | | X | | X |
| SOIL CONDITION | | | | | | | | | | |
| Soil Tilt, Crusting, Infiltration, OM | | X | | | | Most commercial dairy operations meet quality criteria for soil condition while some other livestock operations may overgraze negatively affecting soil conditions but not viewed as significant on watershed basis. | | X | | X |
| Soil Compaction | | X | | | | Most commercial dairy operations meet quality criteria for soil condition while some other livestock operations may overgraze negatively affecting soil conditions but not viewed as significant on watershed basis. | | | | |
| Soil Contaminants | | | | | | | | | | |
| Excess Chemical, elements, metals | | | | | | Not Applicable | | | | |
| Excess animal wastes and organics | | X | | | | Currently some acres receive excess manure because of poor nutrient management. | X | | | X |
| Excess Fertilizers | | X | | | | Commercial fertilizer use is minimal compared to manure. Not viewed as a problem. | | X | | X |
| Excess Pesticides | | X | | | | Pesticide residuals in soil has been not identified as a problem. | | X | | X |
| SOIL DEPOSITION | | | | | | | | | | |
| Onsite Damage | | | | | | Not Applicable | | | | |
| Offsite Damage | | X | X | | | Streambank erosion occurring within agricultural areas is a potential source of sediment to salmonid spawning areas. | X | | | X |
| Onsite Safety | | | | | | Not Applicable | | | | |
| Offsite Safety | | | | | | Not Applicable | | | | |
| WATER QUANTITY | | | | | | | | | | |
| Seeps | | | | | | Not Applicable | | | | |
| Ponding/Flooding | X | | | X | | Headquarters of some farms susceptible to damage from floods or could introduce contaminants to floodwaters if inundated. Some wetland areas have been cut off from tidal effects. | X | | | X |
| Subsurface Water | | X | | | | Not identified as resource concern under current management. | | X | | X |
| Water Outlets | | X | X | X | | Culverts and tidegates currently create barriers to fish passage and hinder water circulation for water quality. | X | | | X |
| Water Mgmt - IRR Land | | | | | | Not Applicable | | | | |
| Water Mgmt - Non IRR land | | | | | | Not Applicable | | | | |
| Restricted Capacity. On-site | | | | | | Not Applicable | | | | |
| Restricted Capacity. Off-site | | | | | | Not Applicable | | | | |
| Restricted Capacity. lakes/streams | | X | X | X | | Culverts and tidegates currently create barriers to fish passage and hinder water circulation for water quality. | X | | | X |
| WATER QUALITY | | | | | | | | | | |
| Ground Water Contaminants | | | | | | | | | | |
| Pesticides | | X | | | | Not identified as resource concern under current management. | | X | | X |
| Nutrients and Organics | X | X | | | | Inadequate animal waste management results in significant potential for loss of nutrients via deep percolation or subsurface flow. | X | | | X |

| | | | | | | | | | | |
|------------------------------------|---|---|---|---|--|---|---|---|--|---|
| Salinity | | X | | | | Not identified as resource concern under current management. | | X | | X |
| Heavy Metals | | | | | | Not Applicable | | | | |
| Pathogens | X | X | | | | Inadequate animal waste management results in significant potential for loss of pathogens in subsurface flow to surface waters. | X | | | X |
| Surface Water Contaminants | | | | | | | | | | |
| Pesticides | | X | | | | Not identified as resource concern under current management. | | X | | X |
| Nutrient and Animal Wastes | X | X | X | | | Inadequate animal waste management results in significant potential for loss of nutrients in surface runoff. | X | | | X |
| Suspended Sediments/Turbidity | X | X | | | | Not identified as resource concern under current management. | | X | | X |
| Low Dissolved Oxygen | | X | X | | | Contributions of nutrients may be limiting DO levels in back water areas. | X | | | X |
| Salinity | | X | | | | Not identified as resource concern under current management. | | X | | X |
| Heavy Metals | | | | | | Not Applicable | | | | |
| Temperature | | X | X | | | Stream temperatures exceed state standards. insufficient shade exists in some areas. | X | | | X |
| Pathogens | X | X | X | | | Inadequate animal waste management results in significant potential for loss of pathogens in surface runoff. | X | | | X |
| Aquatic Habitat Suitability | | X | X | X | | Inadequate riparian/wetland habitat exists along many streams or wetland areas. | X | | | X |
| AIR | | | | | | | | | | |
| Air Quality | | | | | | | | | | |
| Airborne Sediment - Safety | | | | | | Not Applicable | | | | |
| Smoke - Safety | | | | | | Not Applicable | | | | |
| Airborne Sediment - Damage | | | | | | Not Applicable | | | | |
| Smoke - Property Damage | | | | | | Not Applicable | | | | |
| Airborne Sediment - Health | | | | | | Not Applicable | | | | |
| Smoke - Health | | | | | | Not Applicable | | | | |
| Airborne Particulates - Conveyance | | | | | | Not Applicable | | | | |
| Airborne Chemical Drift | | | | | | Not Applicable | | | | |
| Odors | X | X | | | | Manure odors occur with livestock operations but viewed as normal in this historical dairy region. Odors are acceptable to the community. | | X | | X |
| Air Condition | | | | | | | | | | |
| Air Temperature | | | | | | Not Applicable | | | | |
| Movement | | | | | | Not Applicable | | | | |
| Humidity | | | | | | Not Applicable | | | | |
| PLANTS | | | | | | | | | | |
| Plant Suitability | | | | | | | | | | |
| To Site | | | X | X | | Many existing riparian and wetland areas do not have appropriate plant species if the sites are to be used for wildlife habitat. | X | | | X |
| To Intended Use | | | X | X | | Many existing riparian and wetland areas do not have appropriate plant species if the sites are to be used for wildlife habitat. | X | | | X |
| Plant Condition | | | | | | | | | | |
| Productivity | | X | | | | Current pasture and hayland management on dairies results in fair to good pasture condition and on other livestock operations poor to fair condition. This limits overall forage production and the ability of plants to utilize available nutrients. | X | | | X |

| | | | | | | | | | |
|------------------------------------|--|---|---|---|---|---|---|--|---|
| Health and Vigor | | X | | | Current pasture and hayland management on dairies results in fair to good pasture condition and on other livestock operations poor to fair condition. This limits overall forage production and the ability of plants to utilize available nutrients. | X | | | X |
| Damage from Blowing Soil | | | | | Not Applicable | | | | |
| Management | | | | | | | | | |
| Establishment, growth, and Harvest | | X | X | X | Existing level of pasture and hayland management limits production, most riparian and wetland areas not managed to provide wildlife habitat. | X | | | X |
| Nutrient Management | | X | | | Pastures and haylands not managed to maximize the utilization of available nutrients. | X | | | X |
| Pests | | X | | | Some pastures, especially on other livestock operations, have reduced productivity due to weed infestations but not considered significant on a watershed basis. | | X | | X |
| ANIMALS | | | | | | | | | |
| Habitat | | | | | | | | | |
| Domesticated Animals | | | | | | | | | |
| Food | | X | | | Current levels of management on most livestock operations considered adequate for domestic animal health. | | X | | X |
| Cover and/or Shelter | | X | | | Current levels of management on most livestock operations considered adequate for domestic animal health. | | X | | X |
| Water – Quantity and Quality | | X | | | Current levels of management on most livestock operations considered adequate for domestic animal health. | | X | | X |
| Wildlife | | | | | | | | | |
| Food | | X | X | X | Food, cover, shelter and water quality considered inadequate to meet the needs of anadromous fish utilizing area streams and sloughs. | X | | | X |
| Cover and/or Shelter | | X | X | X | Food, cover, shelter and water quality considered inadequate to meet the needs of anadromous fish utilizing area streams and sloughs. | X | | | X |
| Water – Quantity and Quality | | X | X | X | Food, cover, shelter and water quality considered inadequate to meet the needs of anadromous fish utilizing area streams and sloughs. | X | | | X |
| Management | | | | | | | | | |
| Domesticated Animals | | | | | | | | | |
| Population/Resource Balance | | X | | | Systems currently meet the needs of domestic livestock. | | X | | X |
| Animal Health | | X | | | Systems currently meet the needs of domestic livestock. | | X | | X |
| Wildlife | | | | | | | | | |
| Population/Resource Balance | | X | X | X | Food, cover, shelter and water quality considered inadequate to meet the needs of anadromous fish utilizing area streams and sloughs. | X | | | X |
| Wildlife Health | | X | X | X | Food, cover, shelter and water quality considered inadequate to meet the needs of anadromous fish utilizing area streams and sloughs. | X | | | X |

| USDA NRCS OREGON OR-EVT-1 (10/01/20000) <i>Environmental Evaluation</i> <i>and</i> Resource Inventory Checklist | Client/Project Name: <u>Lower Tillamook Bay Watershed Plan /EA</u> County: <u>Tillamook, Oregon</u> Planning Units: <u>1710020307, 1710020306, 1710020305, 1710020304, 1710020303</u> Technician: <u>Terry Nelson</u> Date: <u>03/01/2001</u> Notes: <u>This environmental evaluation considers cumulative effects of all agricultural operations on the watershed not effects on individual farms.</u> | | | | | |
|--|---|------------|---------------------------------|------------|---|---|
| | Special Environmental Concerns (See Documentation Guides) | | Present | | Selected Alternative | |
| | Yes | No | Special Actions Required | | Have actions been addressed? If so, (attach documentation) | |
| | | Yes | No | Yes | No | |
| Cultural Resources (to preserve and prevent the destruction or degradation to cultural resources, including historical or archaeological sites and traditional cultural places) (Documentation Guide OR-EVT-1CR) | | X | | X | | Known sites identified, individual cultural resource reviews will be conducted during on-farm planning. |
| Clean Water Act-404 (to protect US waters and wetlands from fill and dredge materials) (Documentation Guide OR-EVT-1CWA) | | X | | X | | When farm plans contain practices involving fill or removal, 404 permits will be obtained. |
| Coastal Zone Areas (to protect, maintain, and restore coastal waters) (Documentation Guide OR-EVT-1CZA) | | X | | | X | The resource management systems proposed meet the intent of the CZMA. |
| Flood Plain Management (to conserve, preserve and restore existing natural and beneficial values of floodplains) (Documentation Guide OR-EVT-1FPM) | | X | | X | | Most of the resource management systems proposed meet the intent of USDA floodplain management policy, however individual farm plans, when developed, will be evaluated for compliance. |
| Landscape Resource (to preserve and enhance scenic beauty or improve the landscape) (Documentation Guide OR-EVT-1LR) | | X | | X | | Individual farm plans, when developed, will be evaluated for compliance. |
| Natural Area (to recognize and consider impacts when planning and recommending actions to clients on the effects to any nearby, recognized natural areas) (Documentation Guide OR-EVT-1NA) | | | X | | X | |
| Prime & Unique Farmland (to minimize unnecessary and irreversible conversion of farmland to non agricultural use) (Documentation Guide OR-EVT-1PUF) | | | X | | X | |
| Riparian Area (to protect, maintain, and restore riparian areas) (Documentation Guide OR-EVT-1RA) | | X | | | X | Planned resource management systems will have beneficial effect on riparian areas. |
| Special Aquatic Site (to protect, restore and maintain special aquatic sites) (Documentation Guide OR-EVT-1SAS) | | X | | | X | Planned resource management systems will have beneficial effects on the Tillamook Bay estuary. |
| Stream Channelization (to maintain and restore streams, wetlands and riparian vegetation as functioning parts of a viable ecosystem upon which fish and wildlife depend) (Documentation Guide OR-EVT-1SC) | | | | | | |
| Threatened & Endangered Species (to ensure actions to not jeopardize the continued existence of threatened or endangered species) (Documentation Guide OR-EVT-1TE) | | X | | X | | Planned resource management systems will have positive benefits for threatened or endangered species. Consultation under Section 7 will occur for individual farm plans. |
| Wetland (to protect, maintain and restore wetlands to ensure the continued realization of their beneficial uses) (Documentation Guide OR-EVT-1W) | | X | | | X | Planned resource management systems will have beneficial effects on wetlands. |
| Wild & Scenic River (consideration of impacts when planning and recommending actions adjacent to Wild and Scenic River) (Documentation Guide OR-EVT-1WSR) | | | X | | X | |
| Economic (Documentation Guide OR-EVT-1ECO) | | | | X | | Planned resource management systems will require additional capital and management. Some labor and equipment costs savings should be realized. Use of these systems will reduce environmental risks and possibilities of fines. Without compensation the use of these RMS could potentially reduce farmer profits. Project cost-share on enduring practices from this project should help insure overall profitability. |
| Land Use (Change in land use and/or outputs) | | | | X | | |
| Capital (Cash flow and investment requirements) | | | | X | | |
| Labor (Available trained workforce) | | | | X | | |
| Management Level (Knowledge and ability to manage resources) | | | | X | | |
| Risk (Exposure to monetary loss, injury or damage to resources) | | | | X | | |
| Profitability (Returns exceed cost) | | | | X | | |
| Social (No Documentation Guide) | | | | | | With the planned project both the client and communities well being should be improved. The project will improve the sustainability of the farming industry as well as commercial and recreational fishing and shellfishing. The project has been designed to include all types and sizes of farm operations. |
| Client Well Being (Client's perception of their overall quality of life) | | | | X | | |
| Community Well Being (The degree of community support for conservation) | | | | X | | |
| Environmental Justice (people disproportionately & adversely affected by a Government environmental action) | | | | X | | |

Agencies/Persons Consulted: Oregon Department of Environmental Quality, Oregon Department of Agriculture, Oregon Department of Fish and Wildlife, US Army Corp of Engineers, Environmental Protection Agency, and Oregon Department of Human Services, Tillamook County Soil & Water Conservation District, Tillamook Creamery, Tillamook County Performance Partnership.

Additional Considerations:

1. Will permits be required? Yes, they will be applied for as needed on as individual farm plans are developed.
2. Will consultation be required with SHPO, THPO, NMFS and/or USFWS? Who/Why? Individual consultation will be necessary for both cultural resources and endangered species. This will conducted on an individual farm plan basis as they are developed.
3. Have other agencies and stakeholders been involved or informed? (i.e., ODFW, ACOE, DSL, SWCD) Yes, see above list.
4. Does this action tier to other area-wide documents? (i.e. EIS, EA) If so, what? This watershed plan implements many of the agricultural actions identified in the Tillamook Bay National Estuary Plan. It also will assist landowners meet the requirements of a Total Daily Maximum Load established for bacteria and stream temperature and the prohibited conditions of the Agricultural Water Quality Management Plan (SB1010).
5. Degree of public interest/controversy: High Medium Low Public interest is high and public controversy is low.

This Environmental Evaluation documents the potential effects and impacts on the human environment and has aided NRCS to reach the following conclusion on the selected alternative:

This may be a major federal action that will have a significant beneficial effect on the quality of the human environment. Additional evaluation will be needed by completing an environmental assessment and/or an environmental impact statement.

Appendix B - Civil Rights Impact Analysis

Departmental regulation (DR) 4300-4, Civil Rights Impacts Analysis, directs USDA agencies to complete a civil rights impact analysis to identify and address civil rights and environmental justice implications of proposed policy actions.

Project Description

The Lower Tillamook Bay Watershed Plan is designed to improve water quality and fishery habitat within the Lower Tillamook Bay Watershed while improving the economic sustainability of the dairy industry. This plan will help the entire agricultural community meet the requirements under the Clean Water Act and the Endangered Species Act. The financial and technical assistance provided will offer the agricultural community the opportunity to accelerate efforts already underway through the Tillamook Bay National Estuary Study, the Oregon Plan, Tillamook Bay Comprehensive Conservation and Management Plan, and other state and local programs.

Community Profile

Historically, the economic base of the Tillamook area has depended on agriculture, forestry and fishing. More recently, the area has become more of a tourist destination for hiking, beach combing, wildlife viewing, sport fishing, crabbing and clamming. Many people are also finding the area an attractive place to retire.

Based on the 1990 Census of Population (Tracts 9603, 9604, 9605, 960601 and 9602) approximately 12,300 people live within the watershed. Thirty-one percent of the households are considered urban, 3 percent rural farm and 66 percent rural non-farm. In addition 97 percent of the population is white, 18 percent are 65 or older, 75 percent have high school or higher education, and 16.1 percent live below the poverty level. This makes the population in the watershed more rural, older, less educated, and poorer than the state or nation, as a whole (see table below).

| Population Characteristics (U.S. Bureau of Census, 1990). | | | |
|--|------------------|--------------|---------------|
| Characteristic | Watershed | State | Nation |
| Households | | | |
| Percent Urban | 31.4% | 70.2% | 74.5% |
| Percent Rural Farm | 2.9% | 2.1% | 2.1% |
| Percent Rural Non Farm | 65.6% | 27.8% | 27.8% |
| Race | | | |
| Percent White | 96.8% | 92.8% | 80.3% |
| Percent Black | 0.5% | 1.6% | 12.0% |
| Percent Indian | 1.7% | 1.5% | 0.8% |
| Percent Asian or Pacific Islander | 0.4% | 2.4% | 2.9% |
| Percent other | 0.6% | 1.8% | 3.9% |
| Age | | | |
| Percent Less than 18 | 25.7% | 25.5% | 25.7% |
| Percent 18 to 64 | 56.7% | 60.8% | 61.9% |
| Percent 65 or greater | 17.6% | 13.8% | 12.5% |

| | | | |
|--|-------|-------|-------|
| Percent High School or Higher Education (those over 18) | 74.5% | 80.8% | 75.4% |
| Percent of Population Below Poverty Level | 16.1% | 12.1% | 9.3% |

A total of 274 farms (93 dairies, 62 dairy heifer operations, and 119 small farms) were identified in the inventory process. This analysis assumes the farm community has similar demographics as the whole population. The dairy operations derive most of their household income from the farm, whereas, small beef and horse operations depend on off-farm sources for a significant portion of their family incomes.

Of the workers 16 or older, 13 percent work in agriculture, forestry or fisheries; 16 percent in manufacturing; and 20 percent in retail trade. At least 50 percent of those employed in manufacturing work at the Tillamook Creamery. Directly or indirectly, a significant percentage of the watershed's population is affected by agriculture.

Planning Process and Decision-Making

This was a locally requested and lead project. The local Tillamook County Soil and Water Conservation District (SWCD) sought NRCS assistance in watershed planning and implementation. Their concern was over restoring water quality and salmon while sustaining the local economy.

This PL-566 project proposal is a continuation of the community's efforts to restore and protect the resources of the Tillamook Bay watershed begun in 1992 by the Tillamook Bay National Estuary Program (TBNEP). Community involvement was central throughout that planning process and is continuing through the PL-566 planning process.

Public involvement and education has been a key function of the TBNEP. These activities have increases public awareness of the issues and enabled the community to formulate their own solutions. Through the TBNEP, numerous committees, public meetings, volunteer work parties, training sessions and workshops were held, as well as public displays, demonstration projects, videos, and information articles were provided. All these efforts culminated in the completion of a Comprehensive Conservation and Management Plan (CCMP). A Performance Partnership was then created with representation from all sectors of the local community to implement the CCMP. The Lower Tillamook Bay Watershed Plan (PL-566) is an extension of that process. It will allow the local community to implement agricultural actions identified in the CCMP. The SWCD, Performance Partnership and others are part of an advisory committee that is guiding the PL-566 planning process.

All meetings were advertised locally and always well attended. The CCMP and the Lower Tillamook Bay Watershed Plan (PL-566) were made available to the public for review. Comments were received and incorporated into the plan.

The advisory committee took on the responsibility to make decisions regarding project objectives, problems, potential solutions and ultimately selected the NED alternative. All decisions were made by consensus.

Project Benefits

This project was designed to include the entire agricultural community regardless of the type or size of farming operation. Many of Tillamook's small farm operations have not existed for that long and, consequently, have not been involved in prior USDA programs. This PL-566 project reaches out to all farms, offering them both technical and financial assistance to deal with the identified environmental issues. This project will also provide the necessary additional funding to allow NRCS and SWCD to contact and work with the small farm community.

On-farm benefits, in terms of financial assistance, improved forage, fertilizer savings and reduced labor and equipment costs, will be shared proportionately among farmers who choose to participate.

All residents and non-residents will equally share off-farm benefits, such as fishing, clamming, wildlife viewing, and an overall healthier environment.

Civil Rights Impact

Every effort was made to involve all sectors of the community in the development of this plan. Starting with the TBNEP, and now the completion of a PL-566 watershed plan all residents have had an equal opportunity to participate in the watershed's natural resource planning process. Local sponsors will continue to provide local residents opportunities to remain actively involved in the PL-566 implementation process. Financial and technical assistance will be available through the PL-566 program to assist all landowners regardless of farm type or size. Everyone will equally share the on- and off-farm benefits of the Lower Tillamook Bay Watershed PL-566 Project.

Therefore, it is the finding of this analysis that implementing the Lower Tillamook Bay Watershed PL-566 plan will result in no adverse civil rights impacts.

Appendix C Conservation Practices and Components

Estimated Farms Participating:

| | 60 | Farms* | Average | Estimated | Installation | Total |
|---|--------------|------------------|-----------------|----------------|--------------|---------------------|
| | | With | Units | Units in | Cost/Unit | Installation |
| <u>RMS - NC-A1A2-HQ-HQAC</u> | <u>Units</u> | <u>Component</u> | <u>per Farm</u> | <u>Project</u> | | <u>Cost/Project</u> |
| Headquarters, Animal Feed Operation, Confined | | | | | | |
| Practices/Components | | | | | | |
| Waste Management system – 312 | Ea | 60 | | | | |
| See 313, 362, 558, 634 | | | | | | |
| Waste Storage Facility - 313 | Ea | 60 | | | | |
| Above Ground Liquid Manure Tank, Non-Tidal | Cf | 41 | 45,000 | 1,845,000 | \$0.84 | \$1,549,800 |
| Above Ground Liquid Manure Tank, Tidal | Cf | 6 | 45,000 | 270,000 | \$1.12 | \$302,400 |
| Soild Manure/Compost Storage Facility | Cf | 17 | 15,000 | 255,000 | \$1.73 | \$441,150 |
| Waste Collection Tanks (1500 Gal) | Ea | 52 | 1 | 52 | \$850.00 | \$44,200 |
| Site Preparation | Cy | 47 | 250 | 11,750 | \$2.10 | \$24,675 |
| Rock/Fill | Cy | 47 | 400 | 18,800 | \$9.00 | \$169,200 |
| Fiber Mat | Sf | 6 | 7,000 | 42,000 | \$0.08 | \$3,360 |
| Agitator, Wall Mounted, Hydraulic/Electric | Ea | 47 | 1 | 47 | \$10,000.00 | \$470,000 |
| Diversion - 362 | Ft | 13 | | | | |
| Earthen Berms Next to Small Water Courses | Ft | 13 | 100 | 1,300 | \$1.00 | \$1,300 |
| Roof Runoff Management - 558 | Ft | 47 | | | | |
| Roof (slabs, tanks, bunkers) | Sf | 20 | 3,100 | 62,000 | \$6.00 | \$372,000 |
| Waste Facility Cover (tanks, ponds, bunkers) | Sf | 36 | 3,100 | 111,600 | \$2.40 | \$267,840 |
| Roof Gutters & Downspouts | Ft | 11 | 600 | 6,600 | \$2.67 | \$17,622 |
| See 606, 587 | | | | | | |
| Manure Transfer - 634 | Ea | 47 | | | | |
| Waste Transfer Pipe, 5" | Dia In/Ft | 47 | 300 | 14,100 | \$0.58 | \$8,178 |
| Waste Transfer Pipe, 12" | Dia In/Ft | 47 | 100 | 4,700 | \$0.58 | \$2,726 |
| See: 430, 533, 634, 430, 442 | | | | | | |
| Access Road - 560 | Ft | 20 | | | | |
| Access Road, Sloped, Paved Livestock Lanes | Sf | 20 | 2,400 | 48,000 | \$1.05 | \$50,400 |
| Underground Outlet - 620 | Ft | 47 | | | | |

| | | | | | | |
|------------------|----|----|-----|--------|--------|--------------------|
| Site Preparation | Cy | 47 | 5 | 235 | \$2.10 | \$494 |
| Rock/Fill | Cy | 47 | 10 | 470 | \$9.00 | \$4,230 |
| Pipe 6" | Ft | 47 | 400 | 18,800 | \$1.68 | \$31,584 |
| See 516 | | | | | | |
| Total | | | | | | \$3,761,159 |

Other possible practices needed for site specific conditions: 587, 382, 472, 614, 607, 393A, 561

Estimated Farms Participating: 40 Includes 22 Heifer Replacment & 18 Beef or Horse Operations

| Greater Than 5 Animal Units/Farm Headquarters, Animal Feed Oper, Non-Confined <u>RMS - NC-A1A2-HQ-HQANC</u> | Units | Farms With Component | Average Units per Farm | Estimated Units in Project | Installation Cost/Unit | Total Installation Cost/Project |
|---|-----------|----------------------------|------------------------------|----------------------------------|---------------------------|---------------------------------------|
| Practices/Components | | | | | | |
| Waste Management system - 312 See 313, 362, 558, 634 | Ea | 40 | | | | |
| Waste Storage Facility - 313 | Ea | 40 | | | | |
| Soild Manure/Compost Storage Facility | Cf | 40 | 6,000 | 240,000 | \$1.73 | \$415,200 |
| Site Preparation | Cy | 40 | 20 | 800 | \$2.10 | \$1,680 |
| Rock/Fill | Cy | 40 | 20 | 800 | \$9.00 | \$7,200 |
| Diversion - 362 | Ft | 4 | | | | |
| Earthen Berms Next to Small Water Courses | Ft | 4 | 100 | 400 | \$1.00 | \$400 |
| Roof Runoff Management - 558 | Ft | 40 | | | | |
| Roof (slabs, tanks, bunkers) | Sf | 32 | 700 | 22,400 | \$6.00 | \$134,400 |
| Roof Gutters & Downspouts See 606, 587 | Ft | 40 | 200 | 8,000 | \$2.67 | \$21,360 |
| Manure Transfer - 634 | Ea | 0 | | | | |
| Waste Transfer Pipe, 5" | Dia In/Ft | 47 | 300 | 14,100 | \$0.58 | \$8,178 |
| Waste Transfer Pipe, 12" See: 430, 533, 634, 430, 442 | Dia In/Ft | 47 | 100 | 4,700 | \$0.58 | \$2,726 |
| Underground Outlet - 620 | Ft | 40 | | | | |
| Pipe 6" See 516 | Ft | 40 | 100 | 4,000 | \$1.68 | \$6,720 |
| Total | | | | | | \$597,864 |

Other possible practices needed for site specific conditions: 317, 560, 587, 382, 472, 614, 607, 393A, 561

| Estimated Farms Participating: Less Than 5 Animal Units/Farm Headquarters, Animal Feed Oper, Non-Confined <u>NC-A1A2-HQ-HQANC</u> | 16 | Farms With Component | Average Units per Farm | Estimated Units in Project | Installation Cost/Unit | Total Installation Cost/Project |
|--|--------------|----------------------------|--|----------------------------------|---------------------------|---------------------------------------|
| | <u>Units</u> | | | | | |
| Waste Management system - 312 See 313, 362, 558, 634 | Ea | 16 | | | | |
| Waste Storage Facility - 313 | Ea | 16 | | | | |
| Soild Manure/Compost Storage Facility | Cf | 16 | 1,200 | 19,200 | \$1.73 | \$33,216 |
| Site Preparation | Cy | 16 | 20 | 320 | \$2.10 | \$672 |
| Rock/Fill | Cy | 16 | 20 | 320 | \$9.00 | \$2,880 |
| Diversion - 362 | Ft | 3 | | | | |
| Earthen Berms Next to Small Water Courses | Ft | 3 | 100 | 300 | \$1.00 | \$300 |
| Roof Runoff Management - 558 | Ft | 16 | | | | |
| Roof (slabs, tanks, bunkers) | Sf | 8 | 200 | 1,600 | \$6.00 | \$9,600 |
| Roof Gutters & Downspouts See 606, 587 | Ft | 16 | 200 | 3,200 | \$2.67 | \$8,544 |
| Underground Outlet - 620 | Ft | 16 | | | | |
| Pipe 6" See 516 | Ft | 16 | 100 | 1,600 | \$1.68 | \$2,688 |
| Fence - 382 | Ft | 8 | | | | |
| High Tensile, 2&3 Strand | Ft | 8 | 150 | 1,200 | \$1.38 | \$1,656 |
| Heavy Use Area Protection - 561 | Ac | 8 | | | | |
| Site Preparation | Cy | 8 | 20 | 160 | \$2.10 | \$336 |
| Rock/Fill See 560, 382, 587, 575, 614, 516, 533 | Cy | 8 | 60 | 480 | \$9.00 | \$4,320 |
| Total | | | | | | \$64,212 |
| Other possible practices needed for site specific conditions: | | | 317, 560, 587, 382, 472, 614, 607, 393A, 561 | | | |

Estimated Farms Participating:

50 Includes 40 milking & 10 Heifer Replacement operations

| Combined Animal Feeding Operation Wildlife, Riparian <u>RMS - NC-A1A2-WR</u> Practices/Components | <u>Units</u> | <u>Farms With Component</u> | <u>Average Units per Farm</u> | <u>Estimated Units in Project</u> | <u>Installation Cost/Unit</u> | <u>Total Installation Cost/Project</u> |
|--|--------------|-----------------------------|-------------------------------|-----------------------------------|-------------------------------|--|
| Wetland Wildlife Habitat Management - 644 | Ac | 50 | | | | |
| Wetland Habitat Incentive Payment | Ac | 50 | 2 | 100 | \$0.00 | \$0 |
| Tree/Shrub Establishment - 612 | Ac | 50 | | | | |
| Conifers | Ea | 20 | 350 | 7,000 | \$0.75 | \$5,250 |
| Hardwoods | Ea | 20 | 350 | 7,000 | \$1.50 | \$10,500 |
| Shrub Plantings, Cuttings | Ea | 20 | 2,000 | 40,000 | \$0.31 | \$12,400 |
| Tube tree Protectors | Ea | 10 | 175 | 1,750 | \$2.80 | \$4,900 |
| Use Exclusion - 472 | Ac | 50 | | | | |
| Livestock Exclusion | Ac | 50 | 2 | 100 | \$0.00 | \$0 |
| See 560, 382, 587, 575, 614, 516, 533 | | | | | | |
| Fence - 382 | Ft | 50 | | | | |
| High Tensile, 2&3 Strand | Ft | 50 | 4,000 | 200,000 | \$1.38 | \$276,000 |
| Streambank & Shoreline Protection - 580 | Ft | 16 | | | | |
| Rock Barbs | Cy | 16 | 240 | 3,840 | \$25.00 | \$96,000 |
| See 322, 584 | | | | | | |
| Fish Stream Improvement - 395 | Ft | 16 | | | | |
| Habitat Rocks | Cy | 16 | 3 | 48 | \$140.00 | \$6,720 |
| Large Woody Debris | Ea | 14 | 4 | 56 | \$250.00 | \$14,000 |
| Fish Screen | Ea | 10 | 1 | 10 | \$500.00 | \$5,000 |
| See 382, 612, 342, 389 | | | | | | |
| Total | | | | | | \$430,770 |
| Other possible practices needed for site specific conditions: | | | | 391, 382, 587 | | |

| Estimated Farms Participating: Greater Than 5 Animal Units/Farm, AFO Wildlife, Riparian <u>NC-A1A2-WR</u> Practices/Components | 20 | Farms With Component | Average Units per Farm | Estimated Units in Project | Installation Cost/Unit | Total Installation Cost/Project |
|--|--------------|----------------------------|------------------------------|----------------------------------|---------------------------|---------------------------------------|
| | <u>Units</u> | | | | | |
| Wetland Wildlife Habitat Management - 644 | Ac | 20 | | | | |
| Wetland Habitat Incentive Payment | Ac | 20 | 1 | 20 | \$0.00 | \$0 |
| Tree/Shrub Establishment - 612 | Ac | 20 | | | | |
| Conifers | Ea | 8 | 175 | 1400 | \$0.75 | \$1,050 |
| Hardwoods | Ea | 8 | 175 | 1400 | \$1.50 | \$2,100 |
| Shrub Plantings, Cuttings | Ea | 8 | 1,000 | 8000 | \$0.31 | \$2,480 |
| Tube tree Protectors | Ea | 4 | 175 | 700 | \$2.80 | \$1,960 |
| Use Exclusion - 472 | Ac | 20 | | | | |
| Livestock Exclusion | Ac | 20 | 1 | 20 | \$0.00 | \$0 |
| See 560, 382, 587, 575, 614, 516, 533 | | | | | | |
| Fence - 382 | Ft | 20 | | | | |
| High Tensile, 2&3 Strand | Ft | 20 | 1,500 | 30000 | \$1.38 | \$41,400 |
| Streambank & Shoreline Protection - 580 | Ft | 8 | | | | |
| Rock Barbs | Cy | 8 | 160 | 1280 | \$25.00 | \$32,000 |
| See 322, 584 | | | | | | |
| Fish Stream Improvement - 395 | Ft | 8 | | | | |
| Habitat Rocks | Cy | 8 | 2 | 16 | \$140.00 | \$2,240 |
| Large Woody Debris | Ea | 4 | 4 | 16 | \$250.00 | \$4,000 |
| See 382, 612, 342, 389 | | | | | | |
| Total | | | | | | \$87,230 |
| Other possible practices needed for site specific conditions: | | | 391, 382, 587 | | | |

| Estimated Farms Participating: | 10 | | | | | |
|--|-------|----------------------------|------------------------------|----------------------------------|---------------------------|---------------------------------------|
| Less Than 5 Animal Units/Farm, AFO Wildlife, Riparian NC-A1A2-WR | Units | Farms With Component | Average Units per Farm | Estimated Units in Project | Installation Cost/Unit | Total Installation Cost/Project |
| Wetland Wildlife Habitat Management - 644 | Ac | 10 | | | | |
| Wetland Habitat Incentive Payment | Ac | 10 | 0.50 | 5 | | \$0 |
| Tree/Shrub Establishment - 612 | Ac | 10 | | | | |
| Conifers | Ea | 4 | 80 | 320 | \$0.75 | \$240 |
| Hardwoods | Ea | 4 | 80 | 320 | \$1.50 | \$480 |
| Shrub Plantings, Cuttings | Ea | 4 | 500 | 2,000 | \$0.31 | \$620 |
| Tube tree Protectors | Ea | 2 | 175 | 350 | \$2.80 | \$980 |
| Fence - 382 | Ft | 10 | 1 | 10 | | |
| High Tensile, 2&3 Strand | Ft | 10 | 750 | 7,500 | \$1.38 | \$10,350 |
| Streambank & Shoreline Protection - 580 | Ft | 4 | | | | |
| Rock Barbs See 322, 584 | Cy | 4 | 160 | 640 | \$25.00 | \$16,000 |
| Fish Stream Improvement - 395 | Ft | 4 | | | | |
| Habitat Rocks | Cy | 4 | 2 | 8 | \$140.00 | \$1,120 |
| Large Woody Debris See 382, 612, 342, 389 | Ea | 2 | 4 | 8 | \$250.00 | \$2,000 |
| Total | | | | | | \$31,790 |
| Other possible practices needed for site specific conditions: | | 391, 382, 587 | | | | |

| Estimated Farms Participating: | 60 | | | | | |
|---|-------|----------------------------|------------------------------|----------------------------------|---------------------------|---------------------------------------|
| Combined Animal Feeding Operation Pasture, Grazed NC-A1A2-P | Units | Farms With Component | Average Units per Farm | Estimated Units in Project | Installation Cost/Unit | Total Installation Cost/Project |
| Fence - 382 | Ft | 60 | | | | |
| High Tensile, 2&3 Strand | Ft | 60 | 5,000 | 300,000 | \$1.38 | \$414,000 |
| Prescribed Grazing - 528A | Ac | 60 | | | | |

| | | | | | | |
|--|----|----|-------|--------|----------|------------------|
| Waste Utilization - 633 | Ac | 40 | | | | |
| Soil Test, Manure Test, Record Keeping | Ac | 40 | 30 | 1,200 | \$0.00 | \$0 |
| Pipeline - 516 | Ft | 40 | | | | |
| 1 Inch PVC | Ft | 40 | 1,000 | 40,000 | \$0.60 | \$24,000 |
| Trough or Tank - 614 | Ea | 40 | | | | |
| 150 Gallon Trough | Ea | 40 | 2 | 80 | \$106.00 | \$8,480 |
| Total | | | | | | \$205,480 |

Other possible practices needed for site specific conditions: 512, 560, 587, 393A, 620

| Estimated Farms Participating: | | 16 | | | | |
|--|----|--------------|------------------|-----------------|----------------|---------------------|
| Less Than 5 Animal Units/Farm, AFO | | | Farms | Average | Estimated | Total |
| Pasture, Grazed | | | With | Units | Units in | Installation |
| <u>NC-A1A2-P</u> | | <u>Units</u> | <u>Component</u> | <u>per Farm</u> | <u>Project</u> | <u>Cost/Unit</u> |
| | | | | | | <u>Cost/Project</u> |
| Fence - 382 | Ft | 16 | | | | |
| High Tensile, 2&3 Strand | Ft | 16 | 1,000 | 16,000 | \$1.38 | \$22,080 |
| Pasture & Hayland Planting - 512 | Ac | 16 | | | | |
| Pasture & Hayland Planting | Ac | 16 | 2 | 32 | \$281.00 | \$8,992 |
| Prescribed Grazing - 528A | Ac | 16 | | | | |
| Livestock Management, Record Keeping | Ac | 16 | 2 | 32 | \$0.00 | \$0 |
| Nutrient Management - 590 | Ac | 16 | | | | |
| Nutrient Management | Ac | 16 | 2 | 32 | \$0.00 | \$0 |
| Pest Management, Chemical - 595 | Ac | 16 | | | | |
| Chemical Management, Record Keeping | Ac | 16 | 2 | 32 | \$0.00 | \$0 |
| Waste Utilization - 633 | Ac | 16 | | | | |
| Soil Test, Manure Test, Record Keeping | Ac | 16 | 2 | 32 | \$0.00 | \$0 |
| Pipeline - 516 | Ft | 16 | | | | |
| 1 Inch PVC | Ft | 16 | 500 | 8,000 | \$0.60 | \$4,800 |
| Trough or Tank - 614 | Ea | 16 | | | | |
| 150 Gallon Trough | Ea | 16 | 2 | 32 | \$106.00 | \$3,392 |
| Total | | | | | | \$39,264 |

Other possible practices needed for site specific conditions:

512, 560, 587, 393A, 620

Estimated Farms Participating:

5

| | <u>Units</u> | <u>Farms With Component</u> | <u>Average Units per Farm</u> | <u>Estimated Units in Project</u> | <u>Installation Cost/Unit</u> | <u>Total Installation Cost/Project</u> |
|---|--------------|-----------------------------|-------------------------------|-----------------------------------|-------------------------------|--|
| Wetland, Wildlife | | | | | | |
| <u>NC-A1A2-WW</u> | | | | | | |
| Fence - 382 | Ft | 5 | | | | |
| Barbed, 4-Strand | Ft | 5 | 900 | 4,500 | \$0.84 | \$3,780 |
| Wetland Wildlife Habitat Management - 644 | Ac | 5 | | | | |
| Wetland Wildlife Habitat Management | Ac | 5 | 900 | 4,500 | \$0.00 | \$0 |
| Use Exclusion - 472 | Ac | 5 | | | | |
| Livestock Exclusion See 560, 382, 587, 575, 614, 516, 533 | Ac | 5 | 900 | 4,500 | \$0.00 | \$0 |
| Tree/Shrub Establishment - 612 | Ac | 5 | | | | |
| Conifers | Ea | 5 | 150 | 750 | \$0.75 | \$563 |
| Hardwoods | Ea | 5 | 150 | 750 | \$1.50 | \$1,125 |
| Shrub Plantings, Cuttings | Ea | 5 | 700 | 3,500 | \$0.31 | \$1,085 |
| Tube tree Protectors | Ea | 5 | 150 | 750 | \$2.80 | \$2,100 |
| Total | | | | | | \$8,653 |

Other possible practices needed for site specific conditions:

657, 659, 587

| | <u>Units</u> | <u>Farms With Component</u> | <u>Average Units per Farm</u> | <u>Estimated Units in Project</u> | <u>Installation Cost/Unit</u> | <u>Total Installation Cost/Project</u> |
|--|--------------|-----------------------------|-------------------------------|-----------------------------------|-------------------------------|--|
| <u>Other Practices not specific to Guidesheets</u> | | | | | | |
| Pumping Plant for Water Control - 533 | Ea | 30 | | 0 | | |
| Pump | Ea | 30 | 2 | 60 | \$475.00 | \$28,500 |
| Floodwater Diversion - 400 | Ea | 10 | | 0 | | |
| Dike | Cy | 10 | 6,000 | 60,000 | \$4.50 | \$270,000 |
| Stream Channel Stabilization - 584 | Ft | 20 | | 0 | | |
| Rock Weirs | Cy | 10 | 20 | 200 | \$25.00 | \$5,000 |
| Log Weirs | Ea | 10 | 2 | 20 | \$1,000.00 | \$20,000 |
| Critical Area Planting - 342 | Ac | 20 | | 0 | | |
| Willow Posts, Gravel Bar | Ea | 20 | 600 | 12,000 | \$3.25 | \$39,000 |
| Wetland Restoration - 657 | Ac | 25 | | 0 | | |
| Tide Gate* | Dia In/Ft | 18 | 36 | 648 | \$120.00 | \$77,760 |

| | | | | | | |
|--|-----------|-----|-------|---------|--------|-----------|
| Culvert* | Dia In/Ft | 118 | 1,800 | 212,400 | \$1.25 | \$265,500 |
| See 644, 382, 612 | | | | | | |
| * Private Culverts & Tidegates Needing Replacement | | | | | | \$705,760 |
| | Total | | | | | |

Appendix D - Effects of Recommended Plan on Resources of National Recognition

| Types of Resources | Principal Sources of National Recognition | Measurement of Effects |
|---|---|---|
| Air Quality | Clean Air Act, as amended (42 USC 7401 et seq.) | Some reduction in odors from manure. |
| Areas of particular concern within the coastal zone | Costal Zone Management Act of 1972, as amended (16 USC 1451 et seq.) | Resource management systems proposed complement management measures listed in Coastal Zone Act Reauthorization Amendments. |
| Civil Rights and Environmental Justice | Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1975, and Executive Order 12898 Environmental Justice. | All owner/operators will eligible regardless of race, color, national origin, sex, religion, age, disability, political beliefs and marital or familial status and all farm operations will be eligible regardless of size or type. |
| Endangered & threatened species critical habitat | Endangered Species Act of 1973, as amended (16 USC 1531 et seq.) | Habitat for listed salmonids improved significantly. Consultation will occur as individual farm plans are developed. |
| Fish & wildlife habitat | Fish and Wildlife Coordination Act (16 USC Sec. 661 et seq.) | Habitat for listed salmonids improved significantly. |
| Floodplains | Executive Order 11988, Flood Plain Management | No adverse affect, wetland restoration will reconnect rivers to floodplain on about 900 acres. |
| Historic & cultural properties | National Historic Preservation Act of 1966, as amended (16 USC Sec. 470 et seq.) | Seven identified sites will not be affected. Further consultation will occur as individual farm plans are developed. |
| Prime & unique farmland | CEQ Memorandum of August 1, 1980: Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act, Farmland Protection Policy Act of 1981 | Not present in planning area. |
| Water quality | Clean Water Act of 1977 (33 USC 1251 et seq.) | Reduction in bacteria, nutrients, temperature and sediment. In addition aquatic habitat suitability will be increased. Changes will assist agricultural community to comply with state water quality standards. |
| Wetlands | Executive Order 11990, Protection of Wetlands; Clean Water Act of 1977 (33 USC 1251, et seq.) Food Security Act of 1985 | Up to 900 acres restored. |
| Wild & scenic rivers | Wild and Scenic Rivers Act, as amended (16 USC 1271 et seq.) | Not present in planning area. |

