R & E Grant Application 25-27 Biennium

Project #: 25-022

Tillamook Basin Chinook Salmon Abundance Estimates

Project Information

Requested Cycle:	25-2
R&E Project Request:	$130,926
Other Funding:	$79,894
Total Project:	$210,820
Spending Start Date:	7/1/2025
Spending End Date:	6/30/2027
Project Start Date:	7/1/2025
Project End Date:	6/30/2027
Organization:	ODFW - Corvallis Research Lab

Applicant Information

Name:	Katie Woodside
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Past Recommended or Completed Projects

This applicant has no previous projects that match criteria.

Authorized Agent

Name:	Brian Riggers
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Authorized Agent

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Location Information

Where is it?

The project will occur on public land owned or managed by the applicant

Site Description

Street Address, nearest intersection, or other descriptive location.

Trask River. River will be sampled for fish to mark near Head of Tide (Highway 101). Carcasses will be recovered on spawning grounds throughout river basin. Anglers will be interviewed at various public boat ramps and bank access.

Directions to the site from the nearest highway junction.

Trask River flows from the coast range and crosses Highway 101 south of Tillamook.

Following project completion, public anglers will be allowed the following level of access to the project site:

Full access

Please describe what leases, easements, agreements are in place to ensure angler access to the project site, and what is the length of each agreement.

Not applicable. River and bay (basin water) has public access and majority of land that project occurs on is public land (boat ramps, bank access, state forest land). Some land is on Trask River State Hatchery.

Dominant Land Use Type:

Forest
Range/pasture
Cropland
Rural residential

Project Location

General Project Location.

County:	Tillamook
Town/City:	Tillamook
ODFW Dist:	North Coast
Stream/Lake/Estuary Name:	Trask River
Sub-basin:	17100203
Tributary of:	Tillamook Bay

Specific Project Location.

Latitude	Longitude
45.43031	-123.81862

Project Summary

Project Summary

Please provide a couple sentence summary of the proposal.

The project will begin improving ODFW's ability to provide precise, reliable, and cost-effective

spawner escapement estimates of fall Chinook Salmon for the Tillamook Basin. A visual index of Chinook Salmon spawners in the Trask River will be calibrated as determined through mark–recapture methodology. An area-specific creel survey will be conducted.

Overall Project Goals

Describe the primary goals or outcomes of the entire project, including elements not requesting funding from R&E.

1. ODFW's Coastal Chinook Research and Monitoring Program (CCRMP) in collaboration with other ODFW employees will develop and calibrate a visual index of fall Chinook Salmon spawners to a relatively precise estimate of spawner abundance determined through mark–recapture (MR) methodology in the Trask River (a sub-basin of the Tillamook Basin).

2. Conduct an area specific creel to adjust the mark-recapture (MR) estimates by accounting for removal of fish by anglers.

3. Use previous and future funded telemetry studies to expand Trask River estimates to entire Tillamook Basin. Telemetry studies identify proportional distribution of Chinook Salmon within the Tillamook Basin.

Primary objectives of R&E funding

Please describe the measurable objectives for the R&E portion of the funding request.

Produce an estimate of the total annual spawner abundance of adult Chinook Salmon for the 2026-2027 field season such that the coefficient of variation (CV) is 15% or less.

Netting, seining, and/or angling and marking would occur late September through December 2026. Fish will be marked with an operculum punch.

Spawning ground surveys would occur from October/November through January 2027. Sample all Chinook Salmon carcasses encountered on the spawning grounds and collect information regarding origin (collecting snouts if applicable), sex, length, operculum mark, and scales for ageing.

Use an e-Creel to obtain an area-specific estimate of the 2026 harvest of adult Chinook Salmon such that the CV is 15% or less.

Estimate unbiased age-specific proportions of the spawner escapement. Summarize and document methodology, analysis, and recommendations. Reevaluate annually for continuation status and need for additional funding. Analyses occur prior to June 2027.

Current Situation/Justification

Please describe the current situation and explain why this funding is needed.

1.The current fall Chinook Salmon spawner abundance estimate does not include surveys in the Trask Basin. No mark-recapture calibrated index model has been developed for any portion of the Tillamook Basin. There are no e-Creels or traditional creels currently conducted in the Tillamook Basin so there is no validation of ELS harvest estimates. The Peak Count model is currently used to derive spawner escapement estimates in the Tillamook River Basin from four standard surveys, located in the Wilson sub-basin and Kilchis sub-basin, which are two of five sub-basins. One additional standard survey is conducted in Simmons Creek of the Tillamook River. These standard surveys provide historical trend data but are of varied utility for quantifying spawner abundance with statistical certainty.
2.CCRMP (ODFW) conducted a telemetry study in the Tillamook Basin for Chinook Salmon in

2018 as funded by the Pacific Salmon Commission. This study is complementary to that research.
3.CCRMP (ODFW) previously applied for funding from the Pacific Salmon Commission (PSC) for Tillamook Basin Mark-recapture studies in 2023 and 2024; however, funding was limited in amount and project did not rank as high as other submitted PSC projects submitted in those years. It is a high ODFW priority.

Recreation and Commercial Benefit

This project will provide benefits to:

Recreational fisheries
Commercial fisheries

Explain how this project will contribute to current (and/or potential) fishing opportunities, access, or fisheries management.

This study will lead to improved precision and certainty of hatchery and wild adult Chinook Salmon spawner estimates in the Tillamook Basin as well as harvest estimates. This study will also substantially improve information pertaining to the Tillamook Basin fall Chinook Salmon age structure. All of this information will improve forecasting ability which in turn will lead to more certainty when setting fishing regulations and providing harvest opportunities.

Percent benefit split between Commercial and Recreational anglers:

30 % Commercial
70 % Recreational

Please explain, or justify, how the percentage split was determined:

This study primarily focuses on inland recreational sport anglers. There will be benefits to ocean anglers and commercial fisheries, but those are more difficult to quantify as some fish are caught in fisheries outside of Oregon waters. The Tillamook Basin comprises up to 25% of the total abundance of the Pacific Salmon Commission (PSC) Northern Oregon Coast (NOC) aggregates' production which is one of five driver stocks for aggregate abundance-based (AABM) fisheries. The NOC's spawning estimates are provided as input to the PSC's Chinook Model annually in order to account for ongoing estimates of productivity coastwide (which then in turn helps set seasons and bag limits). Despite not occupying one of the NOC's escapement indicator stock designations, the Tillamook Basin has historically played an exceptionally large role in the overall production from this aggregate thus contributing to AABM fisheries (including commercial) in PSC regulated fisheries.

This project has been identified as an ODFW priority for:

Basin/regional
Statewide

Does this project directly support implementation of the ODFW Strategic Plan and/or current Fish Division priorities?

Yes

This project has been vetted by a group of individuals ranking ODFW priority projects being submitted for Pacific Salmon Commission funding in 2018, 2022, 2023, and 2024. This group has primarily been lead by Christine Mallette. Christine previously recommended submission to R and E funding.

Please briefly explain when this was identified as a priority and what process or workgroup was used to identified this as an ODFW priority.

This project has also been mentioned to Fish Division staff and West Region staff in 2024 and

2025 Inland Fish Science Program discussions. The project and funding has been discussed and approved by Robert Bradley, the North Coast District Biologist and the ODFW Chinook Technical Committee representatives (Ethan Clemons).

Identify any plan or other document that identifies this priority.

Previously submitted to Pacific Salmon Commission for funding. Telemetry study published as "Pacific Salmon Commission (PSC). 2019. Semi Annual Progress Report; Tillamook Basin Telemetry. NA17NMF430075 02222019 Report C. Page 11."

Is this project part of an approved Salmon-Trout Enhancement Program (STEP) activity?

No

This project is intended to benefit the following species:

Fall Chinook Salmon

This project will benefit anglers or fishery by providing:

Angling Opportunity
Monitoring/Research

Angling Opportunity

This project will:

More informed management decisions may allow for increased and sustainable harvest and/or production.

Monitoring/Research

This project will be used to evaluate:

Hatchery releases and/or stray rates
Population composition (i.e age, species, survival, size, or genetics)
Angler satisfaction/harvest (Creel)
Distribution (i.e. presence, abscence, abundance)

Has this project been reviewed or developed by an individual with appropriate qualifications (i.e ODFW biometrician, research professor)?

Yes
Project developed by ODFW NRS3 Pacific Salmon Treaty (PST) analyst with 30 years' experience (including conducting and publishing PST funded mark-recapture research) and SFWB with Master of Science in Fisheries and Ecology.

Is this study critical to fishery management decisions?

Yes
What is the adult fall Chinook Salmon spawner abundance for the Trask River sub-basin and Tillamook Basin?
Yes
This study should lead to improved escapement estimates, forecasting, and precision of exploitation rates (harvest rates).

Is there a plan to repeat this monitoring or research in the future?

Yes
Additional studies (mark-recapture and telemetry) will be necessary. Funding may be pursued through R and E, Pacific Salmon Commission, or alternative sources.

Will the data be reported or published?

Yes

This will be reported in an ODFW scientific bulletin, future PSC reports or funding proposals, or peer-reviewed publication. Peer reviewed publication may occur post completion of 3 to 5 years mark-recapture studies and would depend on quality of data, additional telemetry studies, and acceptance.

Project Description

Schedule

Activity	Date	RE Funding
Capture and marking	December 2026	Yes
Spawning ground surveys and recapture	February 2027	Yes
Analysis completed	June 2027	Yes
Creel	December 2026	Yes
Pre-survey work (scouting, planning, hiring, mending nets, purchasing and repairing gear.)	October 2026	Yes

Permits

Permit	Secured?	Date Expected
A general ODFW 4D permit applies to spawning ground surveys. A Tillamook Basin 4D permit was previously approved and would be re-submitted for the 2026-2027 season specific to Trask.	No	2/1/2026

Project Design and Description

Please describe in detail the methods or approach that will be used to achieve the project objectives.

Mark–Recapture (MR)

We will implement a two-sample Lincoln Peterson MR study to generate a full basin spawner abundance estimate for the Trask River basin.

First Event - Capture

In order to alleviate handling stress of adult fish during the saltwater to freshwater transition phase and to minimize tagged fish leaving the sub-basin, the first capture event will take place in the mainstem Trask River at the head of tide which is located near Highway 101. Through in-season evaluation, CCRMP staff will find a location high enough in the system to minimize drop out and low enough to maximize representation of the fishery. Capture activities will begin in late September and continue through December if feasible and as needed to cover the fall spawning migration. Fish will be captured at a rate and timing proportional to that of the run within the constraints of 4D permits.

Chinook Salmon will be captured using the best methodology which could include picket weirs, entanglement nets, angling, and/or seines near the head of tide of the Trask River. Once location and optimal times are established, daily routines will be assigned to optimize fish collection efforts. Field crews will record all data on electronic data loggers, including every net deployment and netting location, type of net, time and duration of the set, tidal stage, number of fish caught, and any pertinent information for future sets. When fish are observed in the net, a crew member will quickly remove it using a soft mesh dip net and transfer the fish to an aerated aluminum live well fitted with a cradle. Biodata will be collected from each fish captured, including length, sex, and fin marks. For all Chinook Salmon assessed to be in good condition, a primary mutilation mark using a ¼” paper punch will be applied to the left or right operculum.

The location of the mark will designate the time period the mark was placed (batch marks). A single mark may be used for more than one week during periods where few fish are being captured. The location of the operculum punch will be recorded for each fish. Scales for age determination will be taken from each Chinook Salmon marked with an operculum punch. Fish that appear to be in poor condition, such as noticeable injuries, and all other fish species captured will be immediately released.

Second Event – Recapture

The second capture event will consist of spawning ground surveys to observe live fish, record biological data including scale collection, and examine carcasses for marks throughout the Trask River sub-basin upstream of the capture site. Recovery efforts will start in October and continue through January or when spawning activity is complete. Spawning ground surveys will include foot and pontoon boat surveys throughout the Trask River sub-basin. Only carcasses with intact opercula will be used in the analysis from the second capture event. All recovered carcasses will be sampled and examined for tags and fin marks, measured for MEPS length, sex, and scales taken for age analysis. Each carcass will be tail-cut to prevent re-sampling.

Creel survey

An e-Creel (electronic creel) will be conducted to determine angler capture and harvest of marked fish as well as harvest of fall Chinook Salmon for the Trask River sub-basin. An e-Creel is an angler survey which combines in-person interviews with ELS data to generate harvest estimates through mark-recapture equations (Riggers and Jones 2022).

Analysis - Mark & Recapture (MR)

We will generate MR estimates using the two-sample Lincoln-Petersen estimator (Williams et al 2002), or a stratified estimator (Schwarz and Taylor 1998). If bias was determined to be negligible, we will derive MR abundance estimates using the Chapman version of the Petersen equation. Equations for MR estimates, MR assumptions, and testing of assumptions can be addressed in greater detail as needed. Index of Abundance, Peak Count, Telemetry, Calibrated Expansion Factors (mean of ratio), Bias, and Analysis and Documentation of Scales Methods and equations pertaining to the index of abundance, peak count, telemetry, calibrated expansion factors, bias, and scale collection for age analysis can be addressed in greater detail as needed. An information report of previous work was included as an attachment.

Some references listed below:

Arnason, A. N., C. W. Kirby, C. J. Schwarz, and J. R. Irvine. 1996. Computer analysis of data from stratified mark-recovery experiments for estimation of salmon escapements and other populations. Can. Tech. Rep. Fish. Aquat. Sci. 2106: vi+37 p.

Bentzen, P., J. B. Olsen, J. E. McLean, and T. P. Quinn. 2001. Kinship analysis of Pacific salmon: insights into mating, homing, and timing of reproduction. Journal of Heredity 92:127–13

Bernard, D. R., S. A. McPherson, K. A. Pahlke, and P. Etherton. 2000. Optimal Production of

Chinook Salmon from the Stikine River. Alaska Department of Fish and Game, Division of Sport Fish, Fishery Manuscript No. 00- 1. Anchorage, AK.

Borgerson, L., B. Clemens, K. Bowden, and S. Gunckel. 2014. Fish life history analysis project: methods for scale analysis. Information Report 2014-10. Oregon Department of Fish and Wildlife.

Cochran, W.G. 1977. Sampling Techniques. 3rd Edition, John Wiley & Sons, New York.

CTC. 2013. Pacific Salmon Commission Joint Chinook Technical Committee. Annual Report of Catch and Escapement for 2012. TCCHINOOK (13)-1. Pacific Salmon Commission. Vancouver, B.C., Canada

Darroch, J.N. 1961. The Two-Sample Capture-Recapture Census When Tagging and Sampling Are Stratified. Biometrika, 48:241-260.

Dittman, A.H., Todd N. Pearsons, Darran May, Ryan B. Couture and David L. G. Noakes. 2015. Imprinting of Hatchery-Reared Salmon to Targeted Spawning Locations: A New Embryonic Imprinting Paradigm for Hatchery Programs. Fisheries, 40:3, 114-123, DOI: 10.1080/03632415.2015.1007206

McPherson, S.A., D.R. Bernard and J.H. Clark. 2000. Optimal Production of Chinook Salmon from the Taku River. Alaska Department of Fish and Game, Fishery Manuscript No. 00-2. 61 pp.
Pacific Salmon Commission (PSC). 2019. Semi Annual Progress Report; Tillamook Basin Telemetry. NA17NMF430075 02222019 Report C. Page 11. Vancouver, B.C., Canada

Pahlke, K.A. 2008. Escapements of Chinook Salmon in Southeast Alaska and Transboundary Rivers in 2006. Alaska Department of Fish and Game, Fishery Data Series No. 08-20, Anchorage, AK.

Quinn, T.P. 1993. A Review of homing and straying of wild and hatchery-produced salmon. Fisheries Research Institute, School of Fisheries, University of Washington, Seattle, WA 98195, USA. Fisheries Research, 18 (1993) pages 29-44.

Quinn, T. P., I. J. Stewart, and C. P. Boatright. 2006. Experimental evidence of homing to site of incubation by mature Sockeye Salmon, Oncorhynchus nerka. Animal Behaviour 72:941–949.

Riggers, B and Jones, M. 2022. Paradigm Shift: Applying Capture–Recapture Techniques to Electronic Licensing System Data to Estimate Chinook Salmon Harvest. North American Journal of Fisheries Management 42:4 815-827.

Schwarz, C.J. and C.G. Taylor. 1998. Use of the Stratified-Petersen Estimator in Fisheries Management: Estimating the Number of Pink Salmon Spawners in the Fraser River. Canadian Journal of Fisheries and Aquatic Sciences 55:281-296.

Williams, B.K., J.D. Nichols and M.J. Conroy. 2002. Analysis and Management of Animal Populations. Academic Press. 14:291-292.

Engineering

Does the project involve capital improvement, engineering, site grading or other construction?

No

Project Management and Maintenance

What is the life expectancy of R&E funded construction, structures, equipment, supplies, data or fishery?

Mark-recapture calibrated index survey designs are valid for decades with the exception of catastrophic events or major changes (landslides, etc.) which may require recalibration. Most equipment for the study already exists; minor repairs are likely needed.

Who is responsible for long term management, maintenance, and oversight of the project beyond what is funded by R&E.

CCRMP (the Coastal Chinook Research and Monitoring Program) within the ODFW IFSP, ODFW (North Coast District Biologist), and the ODFW PSC Chinook Technical Committee representative within OST will be responsible for long term use and storage of data and equipment.

Will the project require ongoing maintenance?

No

Is there a plan to collect baseline data and to conduct monitoring efforts to measure the effectiveness of the project?

Yes

CCRMP will monitor the statistical precision of the estimates as well as recapture numbers. CCRMP can compare e-Creel harvest estimates to ELS estimates.

Project Funding

Funding

Have you applied for OWEB funding for this project?

No

Has this proposal, or similar proposal for this project location, previously been denied by OWEB or other funding source?

Yes

Funding was not secured with the Pacific Salmon Commission (PSC) for the mark-recapture work. Funding was previously secured in 2018 for a telemetry study through the PSC.

Other Funding Source	Type	Secured	Dollar Value	Comments
Pacific Salmon Commission (Letters of Agreement)	Other	Pending	236,948	Funding not secured. Will apply for PSC funding in future.
		Total	236,948	

Budget

Item	Unit Number	Unit Cost	In-kind or non-cash contributions	Funding from other sources	R&E Funds	Total Costs
PROJECT MANAGEMENT						
		SUBTOTAL				
IN-HOUSE PERSONNEL						
ODFW-seasonal specific to project (1NRS1, 4 BSAs)					109,400	109,400
ODFW-CCRMP permanent (880 hours)			60,542			60,542
ODFW-District permanent (240 hours)			18,252			18,252
ODFW-Volunteers (50 hours)			1,100			1,100
		SUBTOTAL	79,894		109,400	189,294
CONTRACTED SERVICES						
Repairs and maintenance for boat, trailer, and motor					1,500	1,500
		SUBTOTAL			1,500	1,500
TRAVEL						
per diem and lodging (hotel in Tillamook)					7,476	7,476
vehicle rental (3 BSA vehicles at 3.5 months each)					7,350	7,350
vehicle rental (1 NRS1 vehicle at 5 months)					3,500	3,500
		SUBTOTAL			18,326	18,326
SUPPLIES/MATERIALS						
scale cards, rope, crew gear, etc.					700	700
		SUBTOTAL			700	700
EDUCATION/OUTREACH						
		SUBTOTAL				
EQUIPMENT						
Boat and marking supplies (livewell bilges, spotlights, etc.)					1,000	1,000
		SUBTOTAL			1,000	1,000
FISCAL ADMINISTRATION						
		SUBTOTAL				
		BUDGET TOTAL	79,894	0	130,926	210,820

Internal Review Results

Review Score: 2.8 out of 5

(1 = Do Not Fund, 2 = Strengthen Proposal, 3 = Recommend with Conditions, 4 = Recommend, 5 = Strongly Recommend)

Specific Review Team Questions

Is a one year study of data collection on the Trask River (which is only 1 of the 5 major tributaries in the Tillamook Basin) enough to develop a basin model of proportional escapement?

No. However, one year of data collection would improve escapement estimates specific to the Trask River. Year one would also be the start of a long-term plan to improve Trask River estimates followed by Tillamook Basin estimates and forecasts. Scale samples collected from Trask River during year one may improve age structure of the entire Tillamook Basin and improve Tillamook Basin forecasts. Year one of a mark recapture study is often needed to fully develop netting locations and methods to mark a sufficient number of Chinook Salmon as well as locate spawning ground survey locations to recapture a sufficient number of marked Chinook Salmon. These survey locations are developed into index surveys that form a group of calibrated index surveys used to derive escapement estimates. Ideally, ODFW would complete 3 to 5 years mark-recapture studies on the Trask River to develop a calibrated index model estimating Chinook Salmon escapement – these three to five years ideally incorporate a variety of environmental conditions and range of returning numbers of fish. Sometime in the next 5 years, ODFW would repeat the 2018 telemetry study for an additional one to two years for the Tillamook Basin. Finally, ODFW would use the proportions of returns by basin seen with telemetry in combination with spawning ground survey data from new Trask River standard index sites and existing standard fall Chinook Salmon surveys on the Wilson and Kilchis to derive a more precise Tillamook Basin estimate.

What are the actual management decisions that could come from this study? Would it result in potentially more fish released into the Trask? Could it actually result in less fish if the proportion of hatchery fish is too high?

Management decisions and hatchery operations are guided by ODFW's Coastal Multispecies Conservation and Management Plan (CMP, adopted in 2014) and Hatchery Genetic Management Plans. Management decisions could include changes to bag limits or fishing seasons for fall Chinook Salmon. In the last seven years, the Tillamook basin has been near or below the CMP critical abundance threshold several times, resulting in constrained fisheries. Improved estimates will ensure greater confidence in management decisions.

Management decisions could also include decisions pertaining to hatchery production or hatchery operations. It is unlikely that this study would result in more released fish. Trask Hatchery is currently described as a harvest program, used for the augmentation of fishing and harvest opportunities. Production numbers would be further guided by the Trask Hatchery capacity and production needs for other species. If Trask River is considered a potential replacement Pacific Salmon Commission (PSC) Northern Oregon Coast (NOC) Exploitation Rate Indicator Stock (ERIS) for Salmon River to meet US/Canada treaty requirements, then there would be an obligation of releasing 200,000 coded wire tagged fall Chinook Salmon smolts into Trask River. The current hatchery release target is 150,000 fall Chinook Salmon smolts. This study would assist in the consideration of Trask River as the replacement stock.

Current CMP pHOS benchmark guidelines for fall Chinook in the Tillamook Basin are 10% for

the entire basin and 30% or 60% within 2 miles of the hatchery release site, depending on whether the area contains higher or lower value spawning habitat. Additional Trask River surveys would not provide information related to the entire basin but could provide additional information specific to the Trask River. As there are no current routine fall Chinook Salmon surveys conducted within the Trask River, this information could provide a better understanding of hatchery straying and overall pHOS in the basin. A pHOS higher or lower than the CMP benchmark would not necessarily result in a decrease or increase in production, but could result in changes in hatchery program management (including the release target, release strategies, broodstock management, etc.).

This appears to be a long term project, what funding source will be relied upon in the future to fund this study?

We would apply for Pacific Salmon Commission (PSC) funding for future years. If PSC funding is not secured (or if funds received were insufficient), we would reapply for R and E funds. We considered the Oregon Conservation and Recreation Fund (OCRF) as a potential alternative funding option. The OCRF coordinator mentioned that the project would meet the OCRF mission, however OCRF typically does not fund ODFW staff time (personnel hours) and that OCRF would be more comfortable funding equipment, materials, subcontractors for an internal ODFW grant.

The budget for this project is made up of mostly ODFW staff time. Are these new positions, or existing positions that are already being funded by ODFW?

These are new positions which would be specific for this work. Pilot studies on the Wilson River indicated that positions specific to the work were needed to mark and recapture a sufficient number of fall Chinook Salmon.

Additional Files

Budget Information

Maps

Tillamook Basin map

Photos

Mark-Recapture Photos

MR Photo Applying Operculum Punch

MR Photo Applying Punch in Tank

MR Photo Chinook in Tank with Gear

MR Photo Chinook Night Net Set

MR Photo Chinook Release

MR Photo Chinook Water Circulation

Design Information

Management Plans and Supporting Documents

2019 Tillamook Telemetry Results	*See p. 12*
e-Creel Methodology	*Riggers and Jones 2022*
Report with Methods and Calculations	*Shows previous completed MR and Telemetry Work*

Permits and Reviews

Partnerships

Public Comment

Letter of Support from District Biologist

Administrative Documents

Signature Authorization Page

Completion Report

A completion report has not been submitted for this project.