Cowlitz Indian Tribe

Natural Resources Department

Frank Shrier
PacifiCorp – LCT 1500
825 NE Multnomah
Portland, OR 97232

RE: Lewis River Aquatic Fund Proposal 2009

January 31st, 2009

Frank,
I am pleased to provide to PacifiCorp the Cowlitz Indian Tribe's full proposal for the *Plas Newydd RM 2.0 Off-Channel Habitat Enhancement*, intended to benefit ESA-listed salmonid species in the watershed of the Lewis River. Our rounded request from the Lewis River Aquatic Fund to implement this proposal totals **$50,000.** Thank you for the opportunity to submit this request, as well as the upcoming opportunity to present in person before the ACC on February 12th 2009.

The Tribe has decided not to submit a full proposal for the *Plas Newydd RM 0.5 Bar Plantings and LWD Structures* project we proposed during the initial round of 2009 applications. The landowner is exploring multiple opportunities at that site and requested we not develop that project within this funding cycle. It remains a future opportunity.

The mission of the Natural Resources Department of the Cowlitz Indian Tribe is to preserve, protect and restore the culturally-relevant habitats and species in our ancestral homelands. This mission arises from the deeply-held connection to the lands and waters, and the Cowlitz Cascadia landscape is the living connection to our ancestors and their way of life.

The Tribe looks forward to learning the decision of the ACC regarding our submittal.
Regards,

/Nathan/

Nathan Reynolds
Ecologist
Cowlitz Indian Tribe
Natural Resources Department
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PROPOSAL FORM -

Lewis River Aquatic Fund 2009

1. Project Title: **Plas Newydd RM 2.0 Off-Channel Habitat Enhancement**

2. Project Manager
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3. Identification of Problem or Opportunity to be addressed:

Problem:
In the lower mainstem of the Lewis River, there is scarce off-channel habitat, which is essential for:

- Chinook salmon, Lower Columbia River ESU, listed as *Threatened*
- Chum salmon, Columbia River ESU, listed as *Threatened*
- Coho salmon, Lower Columbia River ESU, listed as *Threatened*
- Steelhead trout, Lower Columbia River DPS, listed as *Threatened*

These species have endured significant impacts which threaten their persistence in the watershed. These impacts, which arise from various sources, include: alteration of natural flow regimes, degradation of riparian habitat function, loss of floodplain and off-channel habitat areas, inputs of point source and non-point source pollution, and impacts of urbanization.

***Opportunity*:**
The opportunity to restore off-channel habitat addressed in this project proposal will benefit fish recovery throughout the North Fork Lewis River, with priority for federal ESA-listed species. In the short term, this project will increase the abundance of functional habitat in the lower river, an area of great need. The habitat will benefit and be utilized by both returning adults and out-migrating juveniles. Ultimately this project will allow the Lewis River to support larger populations of anadromous fish.

4. Background:
The North Fork Lewis River habitat assessment (Keefe et al. 2004) prepared for the Lower Columbia Fish Recovery Board (LCFRB) identifies several opportunities (section 3.3.3) that have the greatest potential to benefit salmonid production in the basin. Item 2 on this list includes the preservation of "small areas of intact forest within this area of the Lewis River", and specifically identifies a portion of intact forest "on the south bank between river mile 2.0 and 2.7." Maps and aerial photos also indicate the area supports approximately 900 linear feet of intact, functional off-channel habitat. Therefore, this

small, undiked portion of forested floodplain habitat is a significant and important remnant of scarce off-channel habitat once common in the lower river.

The habitat assessment (Keefe et al. 2004) also points to the need to preserve or restore the ecological function of off-channel habitats in the lower Lewis River, stating: "[p]reservation/restoration of floodplain habitats in this area is given a relatively high priority due to the scarcity of functional habitat throughout the first 7.3 miles of Lewis River mainstem channel."

The *Plas Newydd RM 2.0 Off-Channel Habitat Enhancement* site includes a significant component of this scarce floodplain habitat. The enhanced riparian quality achieved though this off-channel enhancement project will ensure the persistence of key habitat by stabilizing the riverbank and reducing erosion. In the absence of stabilization, the river may eventually deposit sediment into the off-channel, filling it in and making it unsuitable for use by salmonid species.

Other relevant planning documents produced for the Lewis River support the need to enhance or preserve off-channel habitat in the lower river area. The Executive Summary of the *Habitat Limiting Factors, Water Resource Inventory Area 27 (Kalama, North Fork Lewis River, And East Fork Lewis River)* states that the second most important recommendation to address limiting factors in the Lewis River is: "Increase and/or enhance off-channel and rearing habitat within the lower Lewis River."(WCC 2005).

Section 7 of the WRIAs 27 and 28 Watershed Management Plan states, "Restoring lowland floodplain function, riparian conditions, and stream habitat diversity" is a priority action in the lower Lewis River. In table 7.1 of that document, it prescribes, "Within authorities, conduct floodplain restoration where feasible along the [lower Lewis] mainstem and in major tributaries that have experienced channel confinement. Build partnerships with landowners and agencies and provide financial incentives." Implementation of this prescription will result in "restoration of floodplain function, habitat diversity, and habitat availability", with a "high" level of certainty (LCFRB 2006).

This proposal is consistent with Recovery Plans because it takes its shape, structure and impetus directly from recent North Fork Lewis River technical assessment and planning documents (Keefe et al 2004, WCC 2005, LCFRB 2006).

Several previous projects have been implemented by the Cowlitz Indian Tribe along the Lower Lewis River. The 2007 ACC award to the Tribe funded the planting of 990 Red-Osier Dogwood, 950 Black Cottonwood, 450 Oregon Ash, and 1100 Willow; 3490 plants total. As well, Tribal staff cut and planted roughly 400 willow-pole plantings. Planting were installed at three locations along the lower Lewis River: Martin Access, Two Forks and Plas Newydd East and West sites.

A 2007 award to the Tribe from the Lower Columbia River Estuary Partnership (LCREP) funded planting of a total of 2580 Willow, 297 Black Cottonwood, 240 Red-Osier

Dogwood and 140 Oregon Ash (3257 plants total) at the same three sites along the lower mainstem Lewis River where the PacifiCorp plantings were implemented.

The 2008 PacifiCorp ACC award to the Tribe funding the installation of seven fish habitat structures composed of anchored large woody debris (LWD) near the mouth Mud Creek. The LWD piles have created a complex of refugia and shelter for juvenile salmonids at the entrance to the Plas Newydd off-channel and the entrance to Mud Creek, one of the only tidal slough habitat areas in the lower Lewis River left undiked. These structures have also created refuge/resting habitat for adult salmonids ascending the system towards headwater spawning habitat.

The 2007 PacifiCorp ACC award was $75,000 plus $10,000 of in-kind value. The LCREP award was $33,200. The 2008 PacifiCorp ACC award was $43,500 plus $8,000 in-kind value. Total restoration funds delivered to Tribally-organized habitat enhancement projects along the lower Lewis River now total $169,700.

5. Project Objective(s):

Plantings:

We propose to enhance the Plas Newydd RM 2.0 Off-channel Habitat in two ways: first, we will plant a shrub/tree complex of 3200 willows, cottonwood, and red-osier dogwood along the water's edge. Second, we will add up to 1140 kg kilograms of salmon carcasses into the off-channel itself.

The shrub/tree complex will consist of a densely planted gallery of 2400 willows (*Salix spp*.), 400 cottonwoods (*Populus trichocarpa*), and 400 red-osier dogwoods (*Cornus stolonifera*). These plants will be placed in a hex grid with sides 0.5 meters in length along the water edge. Installing plants in this density provides multiple utility. Planting at higher densities allows shrubs and tree to outcompete reed-canary grass (*Phalaris arundinacea*) by beating it to canopy, thus shading it out. Another function of this dense planting strategy is to maintain shading function of the shrub/tree complex even in the event of high mortality of plantings (greater than 20%, but less than 60%). Plantings will be installed in the early fall of 2009, prior to the onset of the rainy season.

The tree and shrub species selected are appropriate to the highly-disturbed and frequently-inundated sandy banks of the lower Lewis River. The species have been selected to accomplish multiple goals, including: rapid growth for summer shade to shelter other plantings (Black Cottonwood *Populus balsamifera* ssp.*trichocarpa*), hardiness to withstand inundation and predation, and creation of complex and dense shrub layers (Red-osier Dogwood *Cornus stolonifera,* Sitka Willow *Salix sitchensis*, and Scouler's Willow *Salix scouleriana*). In the long term, these plantings will vegetatively armor and anchor the now-transient sandy landforms and enhance their persistence. Vegetation will help capture and retain river-carried large woody debris, further armoring the landforms. Planting stakes, tubes, weedcloth or other cages will not be used to increase survivorship as inundation will rapidly remove these items.

An intermediate goal of the project is enhanced riparian function; related goals include reduced water temperatures, increased water quality, and the preservation of habitat quality and function in the mainstem and off-channel habitat. Also, the enhanced riparian function will increase organic inputs to the system, which will in turn boost nutrient levels in both the mainstem and proximal downstream off-channel habitat. Bankfall of large trees from a mature riparian forest will eventually serve as source of large woody debris to the river, which may further enhance nutrient loads, create structure and habitat, and armor both the riverbank and the off-channel habitat.

The ultimate goal of this portion of the project is to further enhance the habitat quality of this key off-channel area, which will directly benefit both out-migrating juvenile and in-migrating adult ESA-listed salmonids.

Nutrient Addition:
Salmon carcasses will be introduced into the off-channel to provide a localized pulse of nutrients. Though the lower Lewis River is not a nutrient-poor system, nutrients within the system are waterborne and are not readily available for salmonid consumption because they must be entrained through primary production, die and decompose. Only then are they available as fixed organic nutrients in the lower river, and they are available principally to filter-feeding macro-invertebrates, which typically dominate broad, low-gradient reaches that occur low in river systems. By adding carcasses, we will provide a direct source of nutrient-rich organic matter; flesh and eggs (in particular, lipids) for direct consumption by juvenile salmon, The addition will also promote a pulsed increase in the abundance of macro-invertebrates using a different feeding ecology (shredders/collectors/scrapers rather than just filter feeders), which are important prey for juvenile salmonids.

The availability of a ready food source (both the carcasses themselves and the macro-invertebrate populations that will benefit from them), combined with a source of shade and temperature regulation (the tree/shrub complex) and shelter (the LWD structures) will provide quality rearing habitat for juvenile salmonid species.

Carcasses will be wrapped in durable Vexar mesh, which will then be staked down to prevent the carcasses from exiting the site. Carcasses will be planted in the system in late fall or early winter of 2009; stakes and Vexar will be removed in early spring of 2010.

Washington Department of Fish and Wildlife has prepared protocols and guidelines for nutrient supplementation projects, including salmonid carcasses, since excessive nutrient will negatively affect water quality. WDFW allows carcasses to be delivered at a volume up to 1.9 kg/m². We calculate the area of the off-channel habitat to be 600 m^2. Our estimate is that fall coho carcasses weigh, on average, 5 kg. Therefore, we could stake up to 1140 kg of carcasses (roughly 228 carcasses) in the Plas Newydd RM 2.0 off-channel habitat, without exceeding standards established by Washington Department of Fish and Wildlife and Washington Department of Ecology. We anticipate, however, staking half that, roughly 110 carcasses within the site. Carcasses will be obtained from WDFW

hatchery surplus within the Lewis River system. A carcass placement permit will be required from WDFW.

This proposal is consistent with the Aquatics Fund objectives because the implementation of our project will meet the priorities of the Fund by:

Priority 1: *Benefit fish recovery throughout the North Fork Lewis River, with priority to federal ESA-listed species.*

1. The project site is low in the Lewis River system at RM 2.0 and will provide benefits to the Lower Columbia River ESU of Chinook salmon, the Columbia River ESU of chum salmon, the Lower Columbia River ESU of coho salmon, and the Lower Columbia River DPS of steelhead trout, all listed under the ESA

Priority 2: *Support the reintroduction of anadromous fish throughout the basin.*
The quantity and quality of refugia habitat available to salmonids in the lower river directly affects the number of in-migrating adult salmonids that will survive to ascend further upstream, and thus re-colonize tributaries. The higher carrying capacity and increased habitat quality provided by this project will also translate into increased survivorship of out-migrating juvenile salmonids, which may result in higher returns of adult salmon to the Lewis River system in future years.

Priority 3*: Enhance fish habitat in the Lewis River Basin, with priority given to the North Fork Lewis River.*
This project will directly increase the quantity and quality of key refugia and rearing habitat along the Lewis River.

Finally, the Executive Council of the Cowlitz Indian Tribe has certified resolutions allowing the Tribe's Natural Resource Department to seek and apply for funding from the *Aquatics Fund Program* of the Lewis River Aquatic Coordination Committee to conduct on-the-ground habitat restoration along the lower Lewis River; to benefit juvenile salmonids in the Lewis River Watershed, and to do so in a respectful and honorable manner consistent with Native Culture.

6. Tasks
Task 1: Landowner coordination and whole-project scheduling
Task 2: Apply for necessary permits, (water right, carcass placement)
Task 3: Coordinate purchase and delivery of plant materials and carcasses
Task 4: Install of plantings
Task 5: Assess planting installation success/ prepare short report
Task 6: Prepare as-built plans
Task 7: Install of carcasses
Task 8: Assess carcass installation success/ prepare short report
Task 9: Conduct monitoring to assess survivorship of plantings
Task 10: Conduct monitoring to assess biological success of carcass placement
Task 11: Prepare monitoring report

7. Methods

The Tribe's Project Manager (PM) will coordinate and oversee all aspects of the project. The PM will be responsible for accomplishing all tasks identified in Section 6 above.

In the office, the PM will schedule the overall workflow, purchase materials, coordinate with subcontractors, convey financial information to the accounting dept., and conduct all business necessary to implement the project.

In the field, the PM will identify and layout the project work areas, including needs for planting site preparatory work (invasive species treatment and removal) and planting design. The PM will perform physical fieldwork such as site preparation, planting, and watering of plants. The PM will supervise and oversee the work of subcontractors. The PM will supervise Tribal biotechnicians

The PM will host the Year-1 project closeout site visit for the ACC, prepare as-built plans, and assemble and submit the Year 1 Project monitoring report.

Project administration will be overseen by the Director of the Natural Resources Department of the Cowlitz Indian Tribe. Financial reporting and accounting will be conducted by the Cowlitz Indian Tribe Accounting Dept.

8. Specific Work Products

- Work product 1 will be the completed enhancement plantings and carcass installation

- Work product 2 will be the short reports detailing those installation efforts, which will include staff performance, financial reports, as-built drawings and photographs of the completed enhancement projects.

- Work product 3 will be the monitoring report containing the survivorship assessment of plantings over years 1 and 2. The monitoring report will also evaluate the biological effects of the carcass placement, by comparing macro-invertebrate diversity/density measures in the project site and in a reference site.

9. Project Duration

Final project design will occur in the summer of 2009, planting will occur in late summer/early fall 2009, carcasses will be introduced during late fall/early winter 2009. Stakes and Vexar will be removed early spring 2010. Monitoring of plant survivorship will be conducted in spring 2010, spring 2011 and spring 2012. Monitoring of macro-invertebrate diversity/density measures will be conducted in fall 2009 prior to carcass placement, in fall 2009 some weeks after carcass placement, and in fall 2010. The monitoring report will be completed in Spring 2012.

10. Permits

Only two permits are expected for this project: One is a temporary water withdrawal permit from the Washington Department of Ecology that will allow the Tribe to water

plantings directly from the Lewis River. The Tribe has applied for and received this permit in previous years. The second is a carcass placement permit to allow us to stake carcasses into the site.

The Plas Newydd RM 2.0 Off-Channel Enhancement shoreline and bed are owned by the Plas Newydd Farm LLC through a pre-1885 chain of title. Plas Newydd Farm is jointly managed by Rhidian Morgan and David Morgan. Road access to the off-channel enhancement site is achieved through the Plas Newydd Farm. Written rights of entry have been obtained in the past for previous projects. A verbal right-of-entry has been offered by David Morgan for this project; written confirmation is pending final award of funds

11. Matching Funds and In-kind Contributions

No in-kind is expected to be delivered to this project. As previously noted, however, this project builds on $167,000 of previously completed projects in the same reach of the lower Lewis River.

12. Peer review of Proposed Project

The full proposal presented here was principally developed by Cowlitz Indian Tribal Ecologist Reynolds, but was substantially improved by conversations with David Morgan, (Plas Newydd Farm, Manager/Landowner) as well as Shannon Wills and Rudy Salakory (Cowlitz Tribal Biologists). The proposed budget has been reviewed and approved by the accounting department of the Cowlitz Indian Tribe. The Cowlitz Tribal Council and Executive Council have passed resolutions supporting the Natural Resources Department's scope of work and focus on the Lewis River.

Mr. Reynolds will give a PowerPoint presentation regarding this proposal on February 12th 2009 to members of the ACC, representatives from PacifiCorp, and other professionals in attendance, including individuals from USFWS, WDFW, and USFS.

13. Budget

See attached MS Excel spreadsheet

14. Photo Documentation

Photo documentation will be a significant component of the short report detailing the installation of the planting and the carcasses. It will also be an important component of the final monitoring report.

References:

Keefe et al 2004, Keefe, M., R Campbell, P. DeVries, S. Madsen, D. Resier; *Kalama, Washougal and Lewis River Habitat Assessments, Chapter 3: The North Fork Lewis River Basin*, prepared for the Lower Columbia Fish Recovery Board Dec 2004, Accessed online at: http://www.lcfrb.gen.wa.us/Watershed%20Assessmsent%20Report%20Chps/LCFRB_Chapter3_NFLewisBasin_FINAL_12.31.04.PDF

LCFRB 2006, *Salmon-Washougal & Lewis Watershed Management Plan WRIAS 27-28*, Lower Columbia Fish Recovery Board, 2006 Accessed online at: http://www.lcfrb.gen.wa.us/pdf/WRIA%2027_28%20Watershed%20Management%20Plan.pdf

WCC 2005, *Habitat Limiting Factors, Executive Summary, Water Resource Inventory Area 27, Kalama, North Fork Lewis River, And East Fork Lewis River*, Washington Conservation Commission, Accessed online at: http://salmon.scc.wa.gov/reports/wria27sum.shtml

Figure One: Proposed Off-Channel Enhancement Site

Plas Newydd West Backchannel Enhancement Budget

rs/ndr

ACC Funding Request FY2009

Personnel	FTE	Weeks	Hrs/Wk	Annual Hours	Hourly Rate	Personnel Cost	Total Amount
NRD Director	0.01	32	0.5	16	$ 45.00	$ 720	
Accountant	0.01	32	0.5	16	$ 45.00	$ 720	
NRD Ecologist/Project Manager	0.31	32	20	640	$ 20.00	$ 12,800	
NRD Sci-Tech	0.08	4	40	160	$ 15.00	$ 2,400	
NRD Sci-Tech	0.08	4	40	160	$ 15.00	$ 2,400	
					Year 1 Gross Wages		**$ 19,040**

Payroll Taxes & Benefits					%	Amount
Year 1					36.08%	$ 6,870
					Payroll Taxes & Benefits	**$ 6,870**

Travel	Rate/Mile		Miles/R. trip	Trips/ Week	weeks	Travel Cost
Trips to Plas Newydd	0.550		57	3	10	$ 941
						$ -
					Travel	**$ 941**

Supplies				Qty	Unit	Total
Willows	Dpot			2400	$ 2.55	$ 6,120
Red-osier dogwood	Dpot			550	$ 2.55	$ 1,403
Black Cottonwood	T1			550	$ 2.85	$ 1,568
Oregon Ash	T1			50	$ 2.85	$ 143
salmon carcasses				110	$ 0.40	$ 44
vexar				5	$ 220.00	$ 1,100
wood stakes				220	$ 0.50	$ 110
					Supplies	**$ 10,487**

Other Program Costs				Qty	Unit	Total
Photcopying/Printing				1	$ 100.00	$ 100
Office supplies				1	$ 100.00	$ 100
Nextel phone				0	$ 50.00	$ -
Nextel service (month)				5	$ 40.00	$ 200
Administrative and staging space at the Cowlitz Tribal Offices				5	$ 200.00	$ 1,000
					Other Program Costs	**$ 1,400**

Contractual Services				Qty	Quote	Total
Anderson Earth and Environmental	Planting			3550	$2.50	$ 8,875
Anderson Earth and Environmental	Site prep			1	$1,200	$ 1,200
Anderson Earth and Environmental	Site maintenance			1	$1,200	$ 1,200
					Contractual Total:	$ 11,275
					Total Request	**$ 50,000**

In-Kind				Qty	Unit	Total
						$ -
						$ -
					In-kind	**$ -**
					Total Project Cost	**$ 50,000**

Plas Newydd RM 2.0
Off-Channel Habitat Enhancement

PacifiCorp -- ACC 2009

Cowlitz Indian Tribe

Presentation Overview:

1. Problem
2. Supporting Documents
3. Opportunity
4. Location
5. Proposal Components
6. Companion Projects

Problem:

- The lower mainstem Lewis River contains only scarce amounts of off-channel habitat, which is essential for:
  - Chinook salmon, Lower Columbia River ESU, listed as *Threatened*
  - Chum salmon, Columbia River ESU, listed as *Threatened*
  - Coho salmon, Lower Columbia River ESU, listed as *Threatened*
  - Steelhead trout, Lower Columbia River DPS, listed as *Threatened*

Supporting Documents (1):

- North Fork Lewis River Habitat Assessment (Keefe et al. 2004) identifies opportunities with the greatest potential to benefit salmonid production in the basin.
- Item 2 identifies the preservation of “small areas of intact forest within [the lower reach] of the Lewis River”, and specifically a portion of intact forest “on the south bank between river mile 2.0 and 2.7.”
- Maps and aerial photos indicate the site supports approximately 200 linear meters of intact, functional off-channel habitat. Therefore, this small, undiked portion of forested floodplain habitat is a significant and important remnant of scarce off-channel habitat once common in the lower river.
- The habitat assessment also says “preservation/restoration of floodplain habitats in this area is given a relatively high priority due to the scarcity of functional habitat throughout the first 7.3 miles of Lewis River mainstem channel.”

Supporting Documents (2):

- The Executive Summary of the *Habitat Limiting Factors, Water Resource Inventory Area 27 (Kalama, North Fork Lewis River, and East Fork Lewis River)* (WCC 2005), states that the second most important recommendation to address limiting factors in the Lewis River is: “Increase and/or enhance off-channel and rearing habitat within the lower Lewis River.”

Supporting Documents (3):

- Section 7 of the WRIAs 27 and 28 Watershed Management Plan (LCFRB 2006) states, "Restoring lowland floodplain function, riparian conditions, and stream habitat diversity" is a priority action in the lower Lewis River.

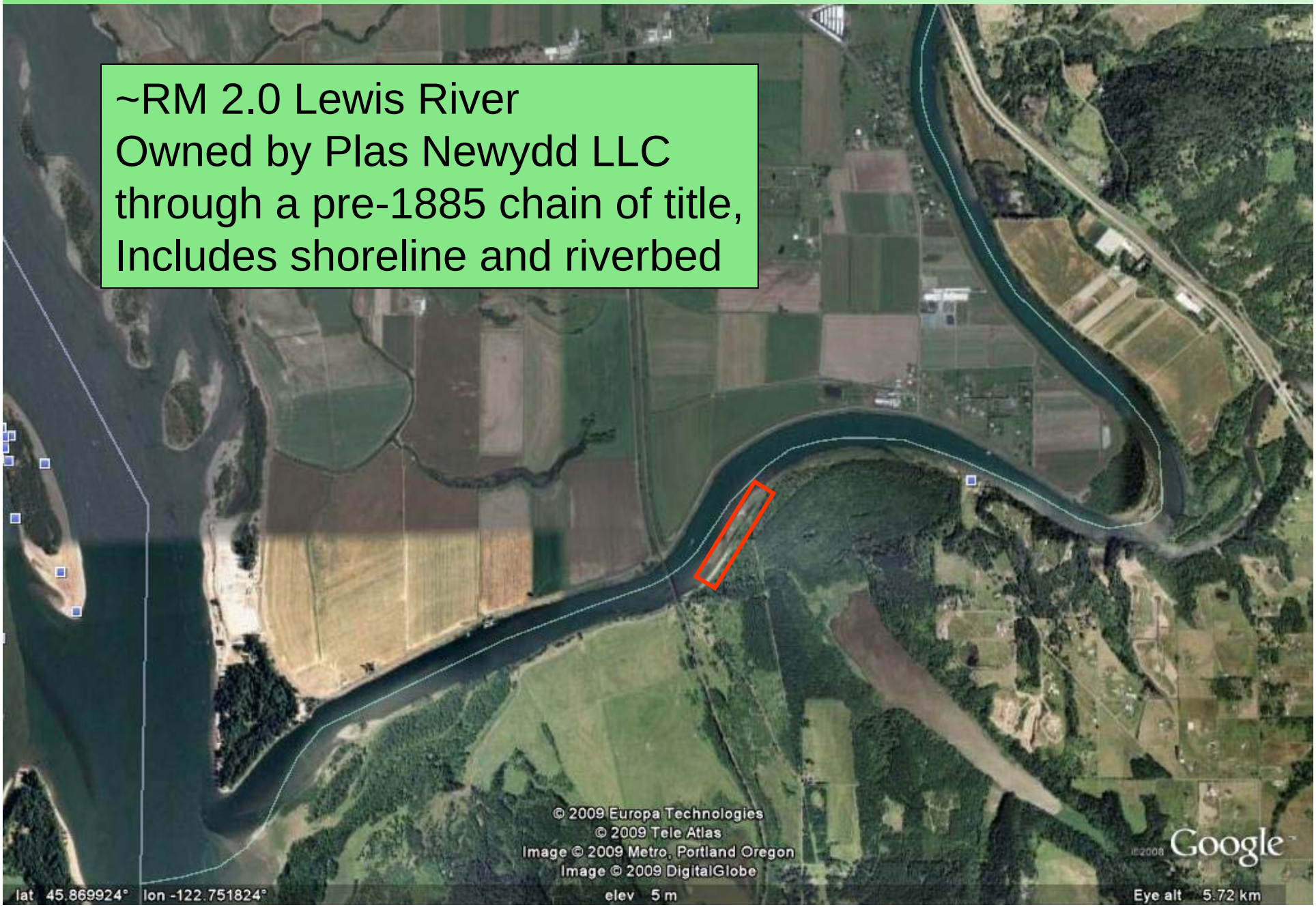
- In table 7.1 of that document, it prescribes, "Within authorities, conduct floodplain restoration where feasible along the [lower Lewis] mainstem and in major tributaries that have experienced channel confinement. Build partnerships with landowners and agencies and provide financial incentives."

- Implementation of this prescription will result in "restoration of floodplain function, habitat diversity, and habitat availability", with a "high" level of certainty.

Opportunity:

- The enhancement of off-channel habitat described in this project proposal will benefit fish recovery throughout the North Fork Lewis River, with priority for ESA-listed species.
- In the short term, this project will increase the abundance of functional habitat in the lower river, an area of great need.
- The habitat will benefit and be utilized by both returning adults and out-migrating juveniles.
- Ultimately this project will allow the Lewis River to support larger populations of anadromous fish.

Location: Lower Mainstem Lewis River



Site Aerial Photo

Proposal Components (1):

Plantings:

- Site-appropriate species
  - 2400 Willows (*Salix spp*.)
  - 550 Black Cottonwoods (*Populus trichocarpa*)
  - 550 Red-osier dogwoods (*Cornus stolonifera*)
  - 50 Oregon Ash (*Fraxinus latifolia*)
  - 3200 trees and shrubs total
- Species are able to survive inundation
- Densely planted in hex grid on 0.5m intervals

Goals of Plantings:

- Enhanced habitat quality and function of the off-channel area for ESA-listed salmonids, through:
  - reduced water temperatures,
  - increased water quality
  - Increased organic inputs to the system
  - Eventual bankfall of large trees from a mature riparian forest will:
    - serve as source of large woody debris to the river
    - further enhance nutrient loads
    - create structure and habitat
    - armor both the proximal downstream riverbank and the off-channel habitat.

Proposal Components (2):

Carcass Additions:

- Carcasses weigh ~5kg each
- 110 carcasses ~ 550kg total
- Carcasses will be wrapped in durable Vexar mesh, and staked down
- Carcasses will be planted in the system in late fall or early winter of 2009; stakes and Vexar will be removed in early spring of 2010.

Goals of Carcass Addition:

- Provide localized pulse of nutrients in readily accessible format:
  - Carcasses provide a direct source of nutrient-rich organic matter; flesh and eggs (in particular, lipids) for direct consumption by juvenile salmon
- Also promote a pulsed increase in the abundance of macroinvertebrates
  - Broad, low-gradient reaches that occur low in river systems are typically dominated by filter feeders
  - Decomposition of carcasses will allow enhance the population of shredders, collectors, and scrapers in the off-channel habitat, which are important prey for juvenile salmonids.

Companion Projects:

- ACC2007
- LCREP2008
- ACC2008

1. Companion Projects: ACC 2007

2. Companion Projects: LCREP 2008

Companion Projects: ACC 2008

Companion Projects Summary:

- ACC2007 -- $75,000 +$10,000
- LCREP2008 – $33,200
- ACC2008 -- $43,500+$8,000
- Total value: $169,700

Conclusions:

- Demonstrated ecological need for the project
- Demonstrated benefits to ESA-listed salmonids
- Willing landowner
- Complements several other projects already completed near or in the site
- Request: $50,000

Proposal is consistent with aquatics fund objectives:

- **Priority 1:** *Benefit fish recovery throughout the North Fork Lewis River, with priority to federal ESA-listed species.*
- **Priority 2:** *Support the reintroduction of anadromous fish throughout the basin.*
- **Priority 3***: Enhance fish habitat in the Lewis River Basin, with priority given to the North Fork Lewis River.*


Questions?