Response to ISRP Preliminary Review of FY 2003 Proposals for the Columbia Estuary Province

Project 30011. Preserve and Restore Columbia River Estuary Islands to Enhance Juvenile Salmonid and Columbian White-tailed Deer Habitat

ISRP Preliminary Comment: *The proposal needs to include a biological (demographic) description of a subpopulation and a better justification of why acquiring the additional islands would lead to delisting. Will the acquisition enable the population to reach a minimum viable size?*

Response: We used the word subpopulation in the manner that it is used in the Columbian White-tailed Deer Recovery Plan (USFWS 1983). The Recovery Plan identifies four main subpopulations (Washington mainland, Tenasillahe Island, Puget Island, and Wallace Island – Westport) "each separated from the next by a main river channel or patches of unfavorable habitat which limit consistent interchange". Evidence for limited interchange comes from Gavin (1984) who noted that the 56 marked deer involved in his studies on the Julia Butler Hansen NWR mainland were quite sedentary and none were observed to move from the area, even temporarily. Further, data in the refuge files show that none of 70 marked and/or radiocollared deer on Puget and Tenasillahe Islands were observed to voluntarily move to another subpopulation (some of these deer moved involuntarily, i.e., they were translocated from Puget Island to Tenasillahe Island). Some movement between subpopulations has been documented by reliable eyewitness accounts. Because of this limited interchange the Recovery Plan (Appendix A) established goals for minimum viable subpopulations (50 deer) as well as the population (400 deer).

The recovery criteria for the population is to maintain a minimum of 400 deer in at least three viable subpopulations distributed in suitable secure habitat (USFWS 1983). Thus, there must be three subpopulations, each containing at least 50 deer and the aggregate equaling at least 400, and each occupying sufficient secure habitat to support these numbers indefinitely. Secure habitat is defined in the Recovery Plan as habitat that is protected from adverse human activities (development harmful to the deer) in the foreseeable future. This has been interpreted as meaning the habitat must be protected by legally binding measures or law (USFWS 1999). Habitat that is in public or conservation ownership and managed for values compatible with deer is generally considered secure (Columbian White-tailed Deer Recovery Team 2001).

The viability of the population is not an issue because overall numbers have been above 600 for at least the last 20 years. Each of the four main subpopulations is also viable with estimated numbers ranging from 130 to 170. The issue is habitat security. Two of the subpopulations – Washington mainland and Tenasillahe Island – are within the Julia Butler Hansen Refuge for the Columbian White-tailed Deer and thus the habitat is secure. The other two subpopulations – Puget Island and Wallace Island-Westport – occupy habit that is primarily privately owned and divided into many ownerships of varying size. Puget Island is divided into hundreds of small properties, so securing sufficient habitat there is not practicable. The USFWS attempted to secure habitat for the Wallace Island-Westport subpopulation. The preferred alternative in an environmental assessment (USFWS 1993) was to obtain permanent protection (conservation easements or fee title) for 1,750 acres. Less than 800 acres (including Wallace Island) were

acquired and there are no immediate prospects for increasing this total due to a lack of willing sellers. The lands acquired support an average of about 30 deer, mostly on 578-acre Wallace Island. While these additions to the refuge are valuable habitat for the deer and other wildlife, they are not sufficient to support a viable subpopulation. There remains a need for a third viable subpopulation on secure habitat to meet delisting criteria.

The Recovery Plan states (pages 32-36) that if sufficient habitat cannot be secured for existing subpopulations, the best alternative is to establish new subpopulations. We now have the opportunity to do that on the island complex that includes Crims, Fisher, Hump, Walker, Lord, and Diblee. All but Crims and Walker are in public ownership and may be considered secure habitat. Crims is the only one of the group that presently has Columbian white-tails because of the successful reintroduction in 1999 and 2000. Bringing Crims into public ownership and reintroducing deer to the other islands would create a third subpopulation on more than 1,700 acres of secure habitat, thus meeting the delisting criteria. This leads to the next question.

ISRP Preliminary Comment: *How was it determined that there was sufficient habitat on the islands to support a viable population of white-tails?*

Response: Both the quality and quantity of habitat contained within the island complex are believed to be sufficient to support a viable subpopulation of more than 50 white-tails.

Davison (1979) evaluated the quality of the Crims Island habitat for Columbian white-tails. He compared plant species occurrence and diversity, forest canopy composition, and dispersion of cover habitat on Crims Island with the Julia Butler Hansen NWR and other islands where white-tails existed. He concluded that the habitat on Crims Island was suitable and the island should be considered as a reintroduction site for the deer. Davison and Spencer (1979) also examined Fisher Island and concluded that the vegetation there was similar to downstream Columbia River islands that support white-tails.

The vegetation on each of the islands is a mix of riparian forest, wooded swamp, grassy "uplands", and intertidal emergent marsh. The wooded areas have an extensive understory of shrubs such as dogwood, willow, and rose, which are preferred browse of the deer. This was the native habitat of the Columbian white-tailed deer before the river was dammed and the lowlands were diked. Therefore, it is reasonable to expect the habitat is suitable for the deer and they will thrive there as they do on undiked islands located downstream such as Wallace Island.

Alan Clark, USFWS, project biologist for the reintroduction and member of the Recovery Team, informally surveyed the islands' habitat during the past two years. Clark found the vegetation and physical features similar to downstream islands, such as Wallace and Brown, that are presently occupied by Columbian white-tails. There was evidence of substantial numbers of black-tailed deer which indicates good habitat quality. Black-tails would be reduced in numbers (by removal) prior to the reintroduction of white-tails to minimize competition.

The quantity of habitat necessary to support a viable subpopulation of 50 or more deer was estimated from existing white-tail densities. The Julia Butler Hansen NWR mainland, where most studies of the deer have occurred, supports an average of 50-70 deer per square mile. The habitat is manipulated for deer by using agricultural practices to provide high quality forage, therefore the density may be higher than would be found in typical unmanaged habitat. Wallace Island, which is not manipulated and consists mostly of riparian forest and swamp, serves as a better reference area. Aerial surveys conducted over a period of years using a sensitive infrared camera (FLIR system) have shown that Wallace typically supports at least 20-30 deer. The island

is nearly a square mile in size, so the deer density is about 25 per square mile. The Crims-Walker-Lord-Diblee-Fisher-Hump Island complex has a total land area of about 2.7 square miles (1730 acres). The habitat is similar to Wallace Island, thus we believe the complex can support a similar density or about 2.7x25 = 68 deer. (The reintroduction on Crims Island is still too new to fully evaluate, but the island has a current population of at least 25 white-tails and many others that were released there have settled on the mainland near the island). We use these calculations as a rough guide, of course. How things will play out in nature remains to be seen. The available evidence suggests a high probability of achieving the objective.

The islands in the complex are close enough together that considerable interchange of deer between them is likely. Crims is farthest from the other islands, being 1.2 miles from Hump. We have evidence that deer from Crims do make moves of that magnitude. At least four have traveled to the Willow Grove area, which is adjacent to Fisher and Hump Islands, and at least one of these has made two or more round trips. Deer from the Crims Island reintroduction may now be on Fisher and Hump Islands (we no longer have radio contact with some of the deer, so we don't know where each individual is). Walker, Lord, and Diblee Islands virtually merge together, as do Fisher and Hump Islands. Hump is less than one-half mile from Walker. Because of this close proximity of the islands to each other and the observed deer movements, deer inhabiting the complex should be considered a single subpopulation rather than several small subpopulations. There is precedent for classifying deer occupying a group of islands as a single subpopulation. Each of the four existing main subpopulations also contains islands that are close together and between which deer move freely. For example, the Puget Island subpopulation includes White, Brown, Jackson, Ryan, and Coffeepot Islands.

ISRP Preliminary Comment: *Was historic Columbian white-tailed deer habitat inundated by federal hydrosystem projects? Is recovery of white-tailed deer a BPA responsibility?*

Response: The historic range of the Columbian white-tail extended along the Columbia from the present location of The Dalles to about Astoria and included the valleys of major tributaries such as the Cowlitz and Willamette, as well as the North Umpqua (Thwaites 1905, USFWS 1983, Gavin 1984). At least along the Columbia, white-tails apparently were confined to the floodplain and did not regularly occupy the conifer forested hills (Bailey 1936, Scheffer 1940). The construction of Bonneville dam and the resulting pool inundated thousands of acres of historical habitat. Also, operation of the hydropower system has greatly reduced the amplitude of flooding along the lower river. The spring freshet, which formerly inundated much of the floodplain (Christy and Putera 1993), no longer occurs. This protection from flooding has resulted in intensive human development in many areas of historical habitat, e.g., southern Clark County, thus precluding the deer from reoccupation in the foreseeable future.

The Columbian white-tailed deer was an original component of the lower Columbia ecosystem. Restoring the ecosystem cannot be fully accomplished without restoring these deer. The Statement of Fish and Wildlife Needs in the *Subbasin Summary* supports the goals of the Recovery Plan and calls for securing the habitat of an additional subpopulation.

ISRP Preliminary Comment: *The applicants need to better justify the proposed physical channel changes? Were the proposed changes based upon a hydrologic assessment to ensure that the actions are likely to achieve the desired objectives? If so, who did the assessment? Have the plans for restoring tidal channels etc., been subject to a hydrologic review?*

Response: The proposed physical changes to the channels within the restoration area are the result of a cooperative study of background information and assessments of alternatives by a team of resource professionals. The team included members with experience in habitat restoration, fisheries science, restoration monitoring, wildlife management and engineering. The proposed changes are based upon a preliminary hydrologic assessment and are thus preparatory in nature. A final hydrologic review will be conducted when funding is available through the USACOE 1135 authority. We identified site needs, restoration alternatives and expected outcomes relative to the proposed hydrologic changes. Discussion of alternatives was followed by field visits to confirm the basic feasibility of restoration ideas. Our review of the restoration project considered the initial feasibility of hydrologic components of the proposed changes. We determined that proposed restorative changes are likely to achieve the objectives given proper engineering design. Team members were:

Alan Clark, USFWS, Wildlife Biologist, Willapa National Wildlife Refuge Complex
Joel David, USFWS, Refuge Manager, Julia Butler Hansen National Wildlife Refuge
Geoff Dorsey, USACOE, Biologist, Portland District
Thomas Kollasch, USFWS, Wildlife Biologist, Willapa National Wildlife Refuge Complex
Jeffery Rose, USFWS, Civil Engineer, Division of Engineering, Portland
Maureen Smith, USFWS, Fish and Wildlife Biologist, Mitigation Coordinator, Columbia River Fisheries Program Office, Vancouver
Robert Stockhouse II, Pacific University, Distinguished Professor of Biology
Kenneth Tiffan, USGS, Fishery Biologist, Columbia River Research Laboratory, Cook
Wayne Van den Naald, ODFW, Fishery Biologist, Wetland Permit Coordinator, Clackamas
Marv Yoshinaka, USFWS, Fish and Wildlife Biologist, Columbia River Fisheries Program Office, Vancouver
Doug Young, USFWS, Fish and Wildlife Biologist, Endangered Species, Portland

The proposed restoration site has been heavily impacted by past land use practices. Reduced flooding amplitude in the lower Columbia River precipitated conversion of thousands of acres of tidal flood plain habitat for agriculture and grazing through diking and ditching. Crims Island's natural concave shape was enhanced by the construction of low dikes at the island's edges. Drainage ditches were excavated through the island's tidal habitats and tide gates were added to seal out regular tidal inundation. The failure of the tide gates years later led to the abandonment of the site for agricultural purposes. Grazing, however, remained a periodic impact. The remaining ditches and dikes continue to alter the hydrology at the site. Presently, reed canary grass (*Phalaris arundinacea*) dominates the restoration area. The current tidal prism provides insufficient flooding to discourage *Phalaris* growth at current site elevations. *Phalaris* is observably less abundant at lower elevations of tidal marshes. Excavation is generally effective for eliminating large monotypic stands of *Phalaris* like those at the restoration site (Robert Stockhouse, Pacific U., pers. comm.). This method would be expected to restore functional habitat, relatively free of *Phalaris*, to this site.

Suitability for juvenile salmon was the primary goal when considering options for habitat restoration at Crims Island. Juvenile salmon are known to use tidal habitats in the vicinity of Crims Island (Wayne Van der Naald, ODFW pers. comm.). Studies have shown that both yearling and subyearling chinook salmon use shallow intertidal areas (McCabe et al. 1986).

Though little to no data is available for juvenile use of tidal freshwater marshes in the lower Columbia River, Miller and Simenstad (1997) showed that juvenile chinook salmon forage in restored channels in the lower Chehalis during outmigration when waters are primarily fresh. The presence of degraded dendritic tidal channels at the restoration site led us to investigate the feasibility of tidal wetland restoration to benefit salmon.

Historical tidal channels at the site have been degraded by direct fill, siltation, tillage and trampling by cattle. Restoration of tidal channels to a predisturbance structure is critical to restoring proper function of intertidal wetlands at the site. The tidal wetlands from Crims Island downriver are typically permeated with conspicuous dendritic and meandering tidal channels. Floodplains upstream display linear shallow troughs with adjacent low ridges formed by high-energy flows that occurred prior to flood control (Christy and Putera. 1993). Crims Island displays features of both channel types. The dendritic channels have been heavily impacted by the practices mentioned above. Reintroduction of dendritic channels will allow for more efficient tidal ebb and flow, increased topographic heterogeneity and efficient transport of detrital material (Callaway 2001). Channels will be designed to mimic channel morphology in similar tidal wetlands nearby. Our intent is to restore historical channels, where they can be located, and to reintroduce similar channels throughout the restoration area. Creation and restoration of second, third and fourth order channel types at appropriate elevations will encourage normal tidal processes to stimulate development of wetland vegetation, invertebrate fauna and stable hydrology. First order channels in the upper tidal areas will develop as a result of varied flow patterns through heterogeneous topography.

Hydrological issues taken into consideration included site topography, soil characteristics, tidal inundation regime, wetland habitat elevation and tidal channel design. Soils present on the site are deep poorly drained soils formed of silty alluvium. Erosive potential is slight. They are well suited to manipulation relative to wetland restoration of this type. Current ditch and dike configuration likely contributes to tidal attenuation, reducing tidal inundation somewhat. Restoring obstructed inlets will increase the basin's tidal prism, decrease flow velocities and restore inundation frequencies. Determining precise elevations suitable for wetland vegetation development will require more intensive surveys and modeling. Team members believe, judging by observed current tidal inundation levels and elevations of nearby tidal marsh, that site elevations are within the workable range to meet proposed habitat restoration objectives.

Hydrologists Paul Christensen and James Zokan, USFWS Division of Engineering, reviewed the proposal and commented as follows: The proposed physical changes to channels have been reviewed by local hydrologists in the Service's Engineering Division located at the Regional Office in Portland, Oregon. The hydrologists found that the proposed actions will likely achieve the desired objectives. Refuge personnel and other resource professionals conducted the initial restoration assessment of Crims Island. The refuge personnel have knowledge of the local hydraulics of the habitats in and around the proposed restoration area through their daily work. Their assessment was based upon inspections of nearby existing habitats associated with fluctuating water levels in side channels, intertidal pools and sloughs. These existing habitats and physical features provide appropriate references for the proposed restoration activities. The elevation and geometry of these features can be measured to accurately relate them to the final design.

Geoff Dorsey, Biologist, USACOE, provided the following response to the ISRP preliminary comments: U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers personnel based the proposed hydrologic changes upon preliminary field observations and review of historical Crims Island aerial photography. No detailed hydrologic analyses have been conducted to date.

Such analyses would be conducted during the feasibility phase of this action. The presence of natural sidechannels, sloughs and intertidal marsh habitat at Crims Island provides ample opportunity to design comparable features on those portions of the island designated for restoration actions. Sloughs and sidechannel depths, cross-sections and sinuosity can be mimicked. Similarly, for marsh and mudflat restoration, we can determine their proper elevation simply by surveying the existing habitats at Crims Island. Thus, we will take advantage of the existing habitat's response to site hydrology to accomplish our objective of restoring additional, comparable habitat.

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