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United States Department of the Interior

NATIONAL PARK SERVICE
Water Resources Division - PEB
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Denver, CO 80225

August 19, 2003

Memorandum

To: Superintendent, Channel Islands National Park
Through: Dan Kimball, Chief, Water Resources Division (WRD)
From: Kevin Noon, PhD, Wetland Scientist, WRD
Subject: Report for Travel to Channel Islands National Park during May 11-16, 2003.

SUMMARY

The purpose of the trip was to: (1) delineate the wetland boundaries at the lower limits of Scorpion, Smugglers, and Prisoners watersheds, Santa Cruz Island, and (2) identify restoration opportunities in each wetland area. The wetland boundaries are drawn on attached aerial photographs. Continued dredging of any of the stream beds (riverine wetlands) in order to protect cultural resources requires a permit from the U.S. Army Corps of Engineers. If the dredging activities, their purpose, and their environmental impacts are defined, acknowledged, and accepted in a park planning or a NEPA document, then the activity can be considered as an exception for maintenance of structures in wetlands according to NPS Directors Order 77-1. Several opportunities exist to restore biological integrity to the estuarine and riverine wetlands of Scorpion, Smugglers, and Prisoners watersheds.

CONTACTS

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DISCUSSION

Wetland Delineation

Wetlands were delineated within the lower end of Scorpion Ranch Cove, Smugglers Cove, and Prisoners Harbor areas on Santa Cruz Island. Aerial photographs, showing the approximate wetland boundaries are attached. All wetlands are classified according to types found in

Classification of Wetlands and Deepwater Habitats of the U. S. (Cowardin et. al. U. S. DOI: FWS/OBS-79/31, 1979).

The wetland boundaries reflect the current extent of wetlands remaining in each of the three areas. They do not show the extent of the wetlands that existed prior to human alterations. An extensive study of historic documents and an analysis of the soils in the floodplains must be completed in order to make a confident decision on the location or extent of the pre-settlement wetlands.

All delineations were conducted using methods approved by the Corps and the NPS for vegetated wetland delineations, i.e., the 1987 *U. S. Army Corps of Engineers Wetland Delineation Manual* and Cowardin et al. (1979) was used for delineating stream channels (riverine wetlands) and shorelines (marine and estuarine wetlands). Soil, vegetation, and hydrologic indicators were analyzed in the field. Sarah Chaney, Botanist, CHIS, identified wetland and upland plant species.

The wetland characteristics are well defined and wetland boundaries were easy to identify on the ground and on the aerial photographs (see Attachment). There are several types of wetland conditions in the cove areas and they are all contiguous to one another (i.e., delineated as one large polygon on the aerial photographs) in each cove area. One type is vegetated and referred to as estuarine or palustrine (emergent, forested, or scrub/shrub wetland); the other type is non-vegetated stream channel referred to as riverine, or non-vegetated intertidal beaches and gravel bars. The top of the bank along the stream channel is the edge of the non-vegetated riverine wetland system. The stream channel may have some small areas of hydrophytic plants.

All wetland boundaries (including riverine and palustrine within the floodplain areas, in the lower sections of the Scorpion, Smugglers, and Prisoners watersheds) were delineated according to current conditions. The location of those wetlands may have been strongly influenced by recent dredging or land management practices. Geomorphologists from the NPS Water Resources Division, Water Operations Branch, suggested that the “active stream channel” extends much further than the immediate channel delineated as wetland. However, areas beyond the immediate stream channel contain vegetation that is considered indicative of non-wetlands and do not exhibit hydrologic characteristics that would classify it as wetland. If the pre-settlement river geomorphology is restored, then the riverine wetland boundaries would likely change and extend around a larger area.

Existing Conditions

Scorpion Ranch Cove Existing Conditions

There are three classes of wetlands that are landward of the subtidal area, i.e., above the low tide limit, of Scorpion Cove. All three areas are contiguous. The rocky shoreline area is classified as Marine/Intertidal/Rocky Shore. Above the shoreline the habitat is Estuarine/Intertidal/Emergent. The remaining wetland area is stream channel which is defined by side slopes and a channel bottom, and is classified as Riverine /Lower Perennial/Rock Bottom (see Attachment: Scorpion Ranch Cove Wetland Delineation, and Photo 1.).

The Marine/Intertidal/Rocky Shore and the Riverine/Lower Perennial/Rock Bottom wetlands have little or no vegetation. The Riverine/Lower Perennial/Rock Bottom wetlands are scoured frequently and receive sand and gravel from upstream sources during storm events.

The Estuarine/Intertidal/Emergent wetland area is irregularly flooded. Common native species include *Distichlis spicata* (saltgrass) *Polypogon monspeliensis*, *Melilotus indica*, *Cressa Truxillensis*, *Frankenia salina* (frankenian), *Suaeda taxifolia* (sea-blite), *Atriplex californica* (California saltbush), *A. coulteri* (Coulter's saltbush), *A. lentiformis* (Brewer's saltbush), *Spergularia macrotheca* (sand-spurry), *S. marina*. Non-native plants include: *Hordeum murinum* (foxtail), *Parapholis incurva* (sicklegrass), *Pennisetum clandestinum* (kikuyu grass), *Atriplex semibaccata* (Australian saltbush), *Cakile maritima* (sea rocket), *Chenopodium murale* (goosefoot) and *Spergularia bocconii*.

The longshore currents and intertidal exchange create and maintain a cobble beach and bar along the shoreline and at the end of the stream channel, before it empties into the ocean cove. The bar reduces intertidal exchange in the wetland area: It inhibits salt water from entering the Estuarine/Intertidal and Palustrine/Emergent wetlands under most conditions. Stream flow



Photo 1. Scorpion Cove Estuary

collects behind the beach and bar and can flood most areas in the valley until it overtops. On occasion tides overtop the bar and salt water gets trapped behind. Occasionally the water backs up the valley and floods the farm-house structures. This occurs primarily in the winter. During the rest of the year the wetland area surface water evaporates and the source hydrology becomes primarily ground water. There are three small vegetated channels (Estuarine/Intertidal/Emergent) in the remaining estuary area that have survived the grading of the floodplain. Their hydrologic conditions support a unique assemblage of plants and animals in a very small area. One unique and rare plant species that is thriving in this condition is *Cressa truxillensis* (alkali weed).

Some of the Estuarine/Intertidal/Emergent wetland areas, and the uplands surrounding the wetland have upland native plants including *Artemesia californica* (California sagebrush), *Eriogonum grande ssp. grande* (island buckwheat), *Eriogonum arborescens* (Santa Cruz Island buckwheat), and *Heteromeles arbutifolia* (toyon). Some of the non-native plants encountered here include *Hordeum murinum* (foxtail), *Avena spp* (wild oats), *Pennisetum*

clandestinum (Kikuyu grass), *Piptatherum miliaceum* (smilo grass), *Brassica nigra* (black mustard), *Foeniculum vulgare* (fennel), and *Silybum maritimum* (milk thistle).

The lower end of the Scorpion Creek riverine wetland channel, including part of the estuarine wetland has been dramatically altered by dredging over the past 100 years. A channel approximately 800-foot long by 35-foot wide (0.6 acre) has been periodically dredged in order to confine and control the creek flows along the south bank. See Photo 3. In addition, sand and cobble material is periodically dredged from the cobble beach and bar along the shoreline located at the end of the stream channel. Prior to grazing and channelization, the stream channel likely meandered back and forth across the entire valley floor through a series of braided channels. In that predisturbance situation, the riverine and palustrine wetlands likely extended across the entire valley floor.

Field investigations and a cursory review of historic photographs and documents suggest that approximately 75 percent of the lower floodplain riparian and wetland areas have been inundated with sediment. Some of the area appears to be flat and may have been graded (see the far right edge of Photo 1.).

Smugglers Cove Existing Conditions

There are two classes of wetlands that are landward of the subtidal area, i.e., above the low tide limit, of Smugglers Cove. Both areas are contiguous. The rocky shoreline area is classified as Marine/Intertidal/Rocky Shore. The remaining wetland area is stream channel which is defined by side slopes and a channel bottom, and is classified as Riverine /Lower Perennial/Rock Bottom. See Attachment: Smugglers Cove Wetland Delineation, and Photo 2.

Marine/Intertidal/Rocky Shore and the Riverine/Lower Perennial/Rock Bottom wetlands have little or no vegetation. The Riverine/Lower Perennial/Rock Bottom wetlands are scoured frequently and receive sand and gravel from upstream sources during storm events.

Some of the common plants on the upland floodplain terraces adjacent to the wetlands include *Distichlis spicata* (saltgrass) and *Salix lasiolepis*. Some of the non-native plants encountered here include: *Eucalyptus* spp., *Hordeum murinum* (foxtail), *Avena* spp. (wild oats), *Pennisetum clandestinum* (Kikuyu grass), *Piptatherum miliaceum* (smilo grass), *Brassica nigra* (black mustard), and *Silybum maritimum* (milk thistle). Approximately 80 percent of the adjacent riparian floodplain terrace overstory is Eucalyptus. The 'upland' area is also being rapidly colonized by native shrubs including: *Artemisia californica*, *Ceanothus arboreus*, *Ceanothus megacarpus*, *Mimulus flemingii*, *Malacothrix saxatilis* var. *implicata*, and others. Other significant non-natives rapidly establishing from surrounding-area seed sources, which will adversely affect the existing floodplain functions and any future restorations, are the tree species olive (*Olea europaea*), tree tobacco (*Nicotiana glauca*) and of course, Eucalyptus.



Photo 2. Smugglers Creek looking upstream from the intertidal beach and bar. Bank slope fill is right of center. The archeological site is far left and center.

An archeological site sits at the mouth of Smugglers Creek, just upstream of the intertidal beach and bar. Within the past few years park staff stabilized 75 feet of the bank slope on the north side of the channel approximately 50 feet from the archeological site. The purpose was to protect the archeological site from further erosion. Park staff placed tree boles at the base of the cut slope and backfilled over them, with soil, to the top of the bank. The area has since revegetated with grasses; however, stabilization of the soft soil fill within the stream channel has not yet been challenged by heavy or intense storm events.

Prisoners Harbor Existing Conditions

There are three classes of wetlands that are landward of the subtidal area, i.e., above the low tide limit, of Prisoners Cove. All three areas are contiguous (see Attachment: Prisoners Harbor Wetland Delineation). The rocky shoreline area is classified as Marine/Intertidal/Rocky Shore. Above the shoreline the habitat is either Palustrine/Emergent/Persistent, Palustrine/Scrub-Shrub/Broad-Leaved Deciduous, or Palustrine/Forested/ Broad-Leaved Deciduous. The remaining wetland area is stream channel which is defined by side slopes and a channel bottom, and is classified as Riverine /Lower Perennial/Rock Bottom.

The Marine/Intertidal/Rocky Shore and the Riverine/Lower Perennial/Rock Bottom wetlands have little or no vegetation. The Riverine/Lower Perennial/Rock Bottom wetlands are scoured frequently and receive sand and gravel from upstream sources during storm events.

The different types of Palustrine wetlands are dominated by *Salix* spp., *Scirpus californicus* (bulrush) and *Typha domingensis* (cattail). Associated native species include *Baccharis douglasii* (sticky baccharis), *Distichlis spicata* (saltgrass), *Salix lasiolepis* (arroyo willow), *B. salicifolia* (mulefat), *Pluchea odorata* (arrowweed), *Berula erecta* (water parsnip), and the non-native plants include *Pennisetum clandestinum* (Kikuyu grass), *Anemopsis californica*

(yerba mansa), *Cotula coronopifolia* (brass buttons), *Gnaphalium luteo-album* (weedy cudweed), *Lythrum hyssopifolium* (loosestrife), *Plantago major* (English plantain), *P. lanceolata*, and *Rumex crispus* (curly dock). The primary forest overstory is *Eucalyptus* spp.

The Prisoners wetland complex has been dramatically altered by filling and dredging over the past 100 years. The pre-settlement wetland area probably extended over the entire floodplain area west of the existing stream channel and northeast of the dock access road (approximately 4 acres). Existing wetland conditions persist above the intertidal beach and extend into a portion of the corral and pasture areas, and measure approximately 3 acres.

The stream has been dredged to create a deep channel for an approximate distance upstream from the beach and bar of greater than 1,500 feet, by 40 feet wide, in order to confine and control the creek flows along the east bank. The dredge spoil has been piled to create berms on either side of the channel. A review of historic information suggests that the original stream channel was shallow and spread approximately 75 to 100 feet wide across most of the floodplain in the area above the main road crossing and adjacent to the pump-station area.

A 60-foot wide berm extends approximately 300 feet along the northwest side of the stream channel, north of the dock access road crossing. The berm area was apparently constructed of channel dredge material to divert stream flows from flooding the corral and pasture areas. The berm also contains three concrete cabin foundations.

Historic photographs and documentation show workers shoveling fill (spilled from a one-ton mining car that moved on a temporary rail-track system) into what used to be an intertidal estuary system. Based on field sampling, the fill material is coarse sand and gravel and was likely dredge material taken from the river channel. Over the years, it appears as though some of the fill closest to the beach and bar has been eroded by stream flooding and intertidal events. The remaining fill area is now the corral and most of surrounding the area.

Approximately 60 percent of the original wetland area has been filled or dredged. Historic photographs show the area as having been Estuarine/Intertidal marsh with no barrier beach or gravel bar. The archeological mound was a distinct feature in the flat intertidal marsh area. Over the years, sediment from upstream areas has accumulated to form the beach and bar. The beach and bar have effectively trapped fresh water and turned the remaining unfilled wetlands from Estuarine/Intertidal marsh into freshwater Palustrine/Emergent/Persistent, Palustrine/Scrub-Shrub/Broad-Leaved Deciduous, or Palustrine/Forested/ Broad-Leaved Deciduous.

Channel Dredging Regulatory Considerations

All wetland areas delineated are under jurisdiction of the U.S. Army Corps of Engineers (as either wetlands or other waters of the U.S.) and any proposed impacts are subject to review according to NPS Director's Order #77-1. Any proposed impacts to those areas will require



permit review from the Corps. Depending on the type of proposed activity and the severity of the impact, the Corps may permit the activity under a nationwide permit or require the completion of an individual permit.

Any dredging activity (within the stream channel or from the cobble beach and bar along the shoreline and at the end of the stream channel, for example see Photo 3) will require a

Photo 3. Scorpion Cove Dredged Stream Channel

permit review from the Corps and will need 401 water quality certification from the State. I spoke with Antal Szijj (805 585 2147, U.S. Army Corps) concerning the need to protect historic structures from flooding by periodically dredging the stream channels. Antal has extensive experience with processing permits for this type of activity. His response was: the dredging is an activity that probably does not fall under any nationwide permit. The activity will likely require an individual permit review. He stated that this activity does not sound like something that would not be permitted. Any proposed impacts to any of the wetlands delineated will also require review and evaluation according to NPS Directors Order 77-1.

For the purpose of NPS review according to Directors Order #77-1, any dredging activities in the Riverine wetlands and their environmental impacts must be defined, acknowledged, and accepted (according to location, approximate aerial extent, and quantity of material to be removed) in the park General Management Plan or a NEPA document. The acknowledgement in the planning document should also state that the spoil material will be deposited in a nonwetland area. The planning document must reflect the intent of Section 5.6 of the NPS Procedural Manual #77-1, i.e., the document must describe the cultural features (e.g. the stone wall archeological feature within the stream channels, the adobe houses, etc.) that are being protected, justify the need to protect them in their current location as opposed to moving them to a non-wetland location, and record the decision to protect them. If the dredging activities in the Riverine wetlands and their environmental impacts are defined as stated above then the activity can likely be considered as an exception (in Section 4.2 (f) of the

Procedural Manual) for maintenance of structures (archeological features: walls and buildings) in wetlands. Exception from completing a Wetland Statement of Findings and compensation requirements does not imply a NEPA exemption.

Restoration Opportunities

Scorpion Ranch Cove Restoration Opportunities

The floodplain area above the remaining estuary appears to have received large amounts of sediment and may have been graded to create a flat area in front of the adobe building. There are three small channels in the remaining estuary area that have survived being filled with sediment and/or grading (see Photo 1.). These are located at the lowest end of the watershed. The hydrologic conditions created in the Scorpion Ranch Cove estuary (i.e., periodic inundation with salt water during the rainy season and then a long summer dry period), support a unique assemblage of plants and animals in a very small area. Any restoration or management activity that changes the hydrologic condition (either period of inundation and/or soil salinity) will likely cause the plant composition to change.

If preservation and expansion of the existing unique plant community is a priority, then I recommend that there be no effort to artificially encourage intertidal exchange; the intertidal gravel beach should be left intact or unbreached. In addition, the area of this unique habitat could be increased; i.e., excavate several new channels (to extend forty to sixty feet) into the graded area above the existing channels. These recommendations do not consider any other management needs.

Factors to consider while evaluating other management or restoration options include the length of time that the habitat conditions (that currently support the existing plant community) will remain, which is unknown. Core sampling data in the floodplain area and park staff suggest that major storm events will continue to deposit large quantities of material at the mouth of the creek, and may eventually fill the wetland habitat.

Other alternatives such as breaching the berm periodically (to release flood flows) may change the habitat requirements (e.g., soil salinity) of the plant community causing a change in species composition. Another factor to consider is that the preferred option in any restoration is to create a naturally functioning situation; one that does not depend on any scheduled human action or intervention. Human interventions can cease at any time for numerous reasons which result in failure of the restoration.

There are two access roads to the Kayak storage area. One extends parallel to the stream from the main road. Another access road extends from in front of the adobe house, diagonally across the floodplain meadow, through the riverine wetland, and connects to the kayak storage area. The adverse effects of driving vehicles through the floodplain and river channel should be carefully considered. Since there is an existing access alternative, I recommend that this road be removed and the riparian floodplain and the riverine wetland channel be restored.

Smugglers Cove Restoration Opportunities

There are no signs of erosion along the bank slope stabilization fill area (described above) and there is a healthy community of herbaceous plants covering the surface of the slope. Major storm events may erode the fill area. Since the bank is not armored with large rock and the subgrade fill material is sand, gravel, and cobble, it would be appropriate to monitor the condition of the stabilization periodically. It may be appropriate to establish tree and shrub species (e.g., willows) or implement an engineered treatment on the fill slope to increase stability and discourage erosion.

Prisoners Harbor Restoration Opportunities

Restore the estuary within the triangle created by the river channel, the dock access road, and the shoreline. This would require discovering the extent of the original wetland area, removing the wetland fill (likely within and beyond the corral area), removing the dike (including the concrete pads) adjacent to the river channel, and replanting the restored estuary.



Photo 4. Prisoners Harbor: The “triangle” area. Recent fill pile (center, base of tree); parking lot, scrub/shrub wetland, and river channel (far right).

The restoration would likely double the size of the existing wetland. An increase of one or two acres is a significant increase to the overall acreage of wetlands on the islands. By design, the restoration could reduce the amount of exotic species, restore the biological integrity of this nearshore wetland area, and restore the historic scene prior to disturbance.

The hydrologic and hydraulic changes caused by any proposed changes to the floodplain and river conditions, that may affect the archeological mound site (located in the upper right side of photo 4), will have to be evaluated using hydrologic models. The mound appears to have stood for thousands of years before the recent human modifications and it stands to reason that the mound will not be adversely affected by shifting the river flow back through the floodplain. The dredging activities keep the river flowing down the east side of the floodplain (far right side of photo 4) and adjacent to the mound. The original dredging operation may have cut away part of the mound site in order to connect the river to the bay. There is evidence that some water from storm events is backing up behind the beach berm and causing erosion of the mound edges.

Allowing the river to meander out of its existing deep channel, at a point several hundred feet above the mound site, and back through the floodplain may reduce the risk of mound erosion.

General Preliminary Procedures for Restoring the Prisoners Harbor Wetland

- Delineate the extent of the pre-settlement wetland conditions, (e.g., old wetland soils, depth and width of river channel), history of change, and the extent of the grading or fill through analysis of historic data and photographs.
- Install networks of hydrologic monitoring wells throughout the proposed restoration area and into adjacent wetland reference areas. A backhoe would likely be necessary in the fill areas.
- At each well location in the fill areas, document soil profiles including depths of fill and elevations of buried (pre-development) soil surfaces. Collect samples from buried soils for seed bank analysis in a greenhouse facility.
- Monitor wells for at least 2-3 years, and perhaps longer if hydrologic restoration is necessary prior to final restoration design.
- Compare hydrologic data to buried soil characteristics and elevations. Determine if the hydrologic conditions still exist to support the pre-disturbance habitat types indicated by the buried soils. Determine the type of community that could be present at each well, based upon ground water level fluctuations, frequency of flooding, duration of flooding, tidal influence, and depth to water table.
- Create a topographic map of the area.
- Complete hydrologic and hydraulic analyses of the existing and proposed conditions.
- Design the restoration using the historic photo's and information, well data, test-pit data, hydrologic and hydraulic analyses, and the topographic map.
- Develop grading plans that will achieve the target plant communities for the final restorations.
- Prepare planting/treatment plans to achieve appropriate estuarine, palustrine, or riverine wetland; riparian; and upland plant communities.
- Complete excavation and planting.

In addition to the restoration improvements to the ecological conditions of the Prisoners Harbor wetlands, I recommend completing the following tasks.

- Remove the two, 50-foot, creosote-soaked telephone poles being used to separate the dock access road from the picnic area. Aside from visitors having to avoid contact with the tar substance oozing from the poles, the chemical release in the floodplain area during storm events or through runoff is not a positive contribution to the health of the adjacent wetland system.

- Remove the recent fill (soil and tree limbs) that was dumped in the wetland at the edge of the corral and prohibit future dumping in the wetland.
- Remove the piled fence rails, any other debris, and the tractor from the floodplain area.
- Remove the parking lot from the floodplain and restore the area. The storage of NPS and Nature Conservancy vehicles within the 100-yr. floodplain and adjacent to the river seems unnecessary. There may be more appropriate areas (at higher elevations) to park vehicles, just south and across the river near the pump station or in the nearby Eucalyptus grove.

Removal of Exotic Plant Species

Regardless of whether the above restoration is completed, a concerted and vigorous program should be immediately implemented to remove non-native plants from the wetlands. The takeover of non-natives is a serious problem. Huge monocultures of non-natives have replaced the more diverse native communities and reduced the functional values of the wetland areas, especially for birds and other wildlife. An extremely busy botanist (Sarah Chaney) will attest to the fact that non-native plant species are rapidly displacing the native plants. The park staff is aware of these problems and during my visit Sarah pointed out a large number of non-native tree species that have escaped from cultural sites and are spreading around the island, e.g., Eucalyptus, olive, fruit trees. She also showed me the particularly aggressive African Kikuyu grass that has taken over large areas of the wetlands and riparian banks, and Fennel that is spreading in the uplands.

The Eucalyptus tree groves are nonnative to the islands and a cultural resource considered worthy of preservation by some park staff members. From an environmental perspective, they serve to reduce wind erosion and shade soil surfaces. They have been planted in other parts of the world for the purpose of reducing ground water levels. In western Australia, for example, rows of Eucalyptus trees are used to reduce ground water levels (through transpiration, interception, and evaporation) by up to twenty-three inches per year. A literature review and/or research are needed to identify the adverse affects (caused by the Eucalyptus), if any, to ground water flow and availability to the wetlands on the island.

Action Items

Park staff should explore, with Antal Szijj (805 585 2147, U.S. Army Corps) 404 and 401 (State water quality) permit compliance issues related to the continued dredging of the stream channel. Kevin Noon will provide assistance if necessary.

Kevin Noon can provide assistance on any restoration activities the park decides to implement. If you have any questions regarding this report please call Kevin Noon at (303) 969-2815.

cc: (by e-mail only)

2380 - Kimball, Jackson, Flora, J. Wagner, K. Noon, Hennessy (file)

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PWR - Kolipinski

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Attachment: Wetland Delineation Within the Lower End of Scorpion Ranch Cove, Smugglers Cove, and Prisoners Harbor Areas



Scorpion Ranch Cove Wetland Delineation



Smugglers Cove Wetland Delineation



Prisoners Harbor Wetland Delineation