evaluate fish and wildlife presence within the project area. While it may seem that this second set of criteria is sufficient to determine the success of the project, this is not always the case. Presence or absence of a target species fails to quantify the value of the habitat for the species. Failure to observe the target species within the project area does not always mean that it has not, or will not in the future, use the area. Finally, it could be argued that it is not the responsibility of a project proponent to insure use of a habitat site, only to provide the conditions necessary to support that use.

The approach taken in this monitoring program relies primarily on an evaluation of habitat attributes such as vegetation and prey resources to evaluate project success. However, this data will be supplemented with some direct measurement of target species, including juvenile salmonids and other estuarine fish, as well as bird use of the restoration sites.

Marsh Vegetation Establishment

Biological Success Criterion 1

The areal extent (percent cover) of vegetation should be stable or increasing within portions of the project site with elevations suitable to marsh establishment.

Biological Success Criterion 2

Species composition of native wetland plant species should be comparable to that of appropriate reference sites, and should not contain greater than 1% cover by area by non-native or invasive plant species. Invasive plant species of special concern include *Spartina* spp. (cordgrass), *Lythrum salicaria* (purple loosestrife), *Phalaris arundinacea* (reed canarygrass), and *Phragmities communis* (common reed).

Biological Success Criterion 3

Plant vigor, as measured by stem height and shoot density, should be comparable (greater than 80%) to that of appropriate reference sites and/or improving over time.

Project Sites

These criteria will be applied to all sites.

Monitoring Tasks

Areal Extent

Areal extent of vegetation will be measured from aerial photographs, if available. Alternatively, given the anticipated size of vegetation patches, it is feasible to use either GPS or more traditional survey techniques to map the patch perimeter.

Species Composition and Plant Vigor

Based on consultation with a biostatistician, several permanent transects will be established at each project site perpendicular to the shoreline. The transects will encompass portions of the project area suitable for intertidal vegetation establishment. Transects will also be established within suitable reference sites near the project site. During mid-summer, the transects will be surveyed to determine species composition. Ten (or more, depending on length of transect) 0.25 x 0.25 m quadrats will be randomly distributed along each transect line. All plant species observed within the quadrat will be recorded, and percent cover of species within the transect estimated. Permanent transects will be periodically surveyed, to determine elevation ranges for vegetation communities at project sites.

Plant vigor will be assessed during the same sampling event using these quadrats. In each

quadrat, the total number shoots of the "target" vegetation species (e.g. *Carex lyngbei, Scirpus validus*) will be counted. The height of the three tallest shoots for each represented target species will also be measured to the nearest cm.

Data analysis will include an estimate of areal extent of marsh vegetation cover, and any observations in changes over time. Similarly, trends in mean shoot density (# shoots/ m^2) and mean maximum shoot height will be reported. Finally, species composition of marsh vegetation, and any occurrence of invasive species that exceeds 1% will be reported.

Years
The monitoring tasks are to be completed in years 1, 2, 3, 5, 7, and 10.

Contingency Measures
Any occurrence of invasive species that exceeds the threshold established in Criterion 2 will be met with an immediate response of control measures. Physical removal will be undertaken prior to consideration of the use herbicide.

Evidence that planted vegetation is not thriving, or that natural recruitment rates fail to meet expectations of will trigger consideration of contingency measures. Depending on the hypothesized reason for this failure to meet the criteria, responses could include additional planting, soil amendments, herbivore exclusion, and/or focused stewardship efforts. The efficacy of structures intended to limit Canada goose herbivory will be evaluated. Assumptions about appropriate plant species, elevations, and other design factors should be reexamined.

Discussion
An important objective of all EB/DRP intertidal habitat projects is the establishment of marsh vegetation. Vegetation provides habitat structure, facilitates sediment accretion and build up of the marsh substrate, and serves as a source of organic material to support detritus-based food webs. Periodic examination of the vegetation will assist in the identification of potential problems, such as colonization by invasive plant species, excessive herbivory, or trampling by humans. Useful measures of vegetation community condition include plant distribution, species composition, and plant vigor.

Riparian Vegetation Establishment

Biological Success Criterion 4
Areal extent of riparian vegetation (native trees and shrubs) should be stable or increasing over time, and cover not less than 90% of the upland vegetated area of each project site at the end of ten years. Invasive plant coverage should be minimal; species of special concern include *Rubus procerus* (Himalayan blackberry), *Cytisus scoparius* (Scot's broom), and *Polygonum cuspidatum* (Japanese knotweed). Percent coverage of vegetation layers should be as shown in the following table:

Vegetation Layer	Year 3 coverage	Year 5 coverage	Year 10 coverage
herb	>70%	percentage may decline as other layers mature, provided not more than 10% bare ground	
shrub	>30%	>50%	>80%
tree	>25%	>40%	>70%
non-native vegetation	<10%	20%	<20%

Biological Success Criterion 5
Survival of riparian plantings in each cover class category (herb, shrub, trees) should be at least 75% at the end of three years.

Project Sites
These criteria will be applied to all sites.

Monitoring Task
Using aerial photograph analysis or standard survey techniques, map the portion of the project area with riparian vegetation cover.

Extend vegetation transects established for marsh vegetation monitoring shoreward, through the riparian zone, to the limits of the project area. Use visual survey techniques such as point line intercept or quadrats to estimate planting survival along the transect line.

Years
The first monitoring task (areal extent) is to be completed in years 1, 2, 3, 5, 7, and 10. The second monitoring task (plant survival) is to be completed in years 1, 2, and 3.

Data should be reported as percent cover of riparian vegetation, and percent survival of plantings broken down into the herb, shrub, and tree components.

Contingency Measures
Excessive failure rates for planting survival will be addressed with contingency measures. Potential causes may include improper installation, poor soil structure and/or organic content, inadequate watering, herbivory, trampling or competition. Improved site stewardship may address many of these problems, but replanting with improved soil preparation may also be necessary. While the criteria should be used in evaluating project performance, it is also important to recognize the need for some flexibility in managing the project sites. Failure to meet numeric criteria should not trigger an automatic response that might prove damaging to the project.

Inadequate riparian vegetation coverage may also be attributed to the same causes. Appropriate response may include additional plantings, soil amendments, and/or improved stewardship.

Discussion
The establishment of healthy riparian plant communities at each habitat site is an essential project element. Native trees and shrubs provide a buffer to adjacent urban and industrial land uses and habitat structure for wildlife. Insects growing on riparian vegetation that are deposited in the water can provide an important prey resource for fish. Leaf litter enhances detritus food webs when transported into adjacent intertidal areas. Large organic debris is also important for habitat structure.

Bird Use

Biological Success Criterion 6
Use of the restoration sites and the area within 50 meters of the site by indigenous/native bird species should be comparable of that to appropriate reference sites.

Project Sites
This criterion will be applied to all sites.

Monitoring Task
Using the protocols and categories (ie. passerine, raptors, shorebirds/waders, waterfowl, seabirds, introduced, and native but human associated) described by Cordell et al. (1999), describe bird use of the restored sites and appropriate reference areas. Data will be presented as species observed, mean abundance (by category), and species richness of indigenous/native bird species.

Years
The monitoring tasks are to be completed in years 1, 2, 3, 5, 7, and 10.

Contingency Measures
Low bird use of restored sites, relative to reference areas, may indicate human disturbance. If data indicates that indigenous/native bird species are absent, or present infrequently or in low numbers, public access and other management activities at the site should be examined for potential impacts to wildlife.

Discussion
Use of the sites by birds would be a good indication of improved habitat conditions. Previous monitoring studies of Duwamish River restoration sites have loosely grouped seasonal and resident birds into guilds, as well as categorized introduced and native, but human-associated species separately (Cordell et al. 1994, 1996, 1997, 1999). These distinctions have been useful in evaluating the wildlife habitat function of the sites.

Fish Access/Presence

Biological Success Criterion 7
Estuarine fish will access the project sites. Juvenile salmonid presence within the project sites should be comparable to that of appropriate reference sites at the end of ten years.

Project Sites
This criterion will be applied to all four project sites.

Monitoring Tasks
Consistent with the protocols described by Cordell et al. (1997, 1999) for the T-105 restoration site, fish access at Seaboard Lumber, Hamm Creek estuary, and North Wind's weir will be monitored by use of fyke net or block seine. At high tide, a net which

completely blocks the mouth of the project area will be deployed, and monitored during the subsequent ebb. At the Kenco Marine/Turning Basin vicinity site where use of a fyke net or block seine is not practical, a beach seine shall be used at high tide using the protocols describe in Warner and Fritz (1995). At all sites, captured fish will be briefly anesthetized, identified to species and counted. Fork length measurements will be taken from all salmonids. All fish will be released unharmed, unless stomach content analysis on a subset of captured fish is determined necessary by USFWS. Consideration will be given to marking a subset of the captured salmonids to determine residence time.

Given the importance placed on juvenile salmonids, the sampling will occur on a twice monthly basis during the period of juvenile out-migration, i.e. from early March through early June. If resources permit, consideration should be given to undertaking fish access monitoring for a longer period, perhaps throughout the year.

Years
The monitoring tasks are to be completed in years 1, 2, 3, 5, 7, and 10.

Contingency Measures
Failure to meet fish access criteria would indicate that fundamental EB/DRP goals are not being met. While the specific causes are difficult to project at this point, an examination of the project design, implementation, and site management would be warranted. Outside expert assistance may be obtained in evaluating the monitoring data and project performance.

Discussion
An issue of significant importance to EB/DRP is the provision of habitat to support estuarine-dependent fish species. Of special interest are juvenile salmonids, which are known to utilize these areas (Aitkin, 1998), and which may be limited in part by lack of high quality intertidal habitat in the Duwamish River estuary. Evaluation of this program goal will rely upon measuring both fish access to the restored sites, and the provision of prey resources, including fallout insects and benthic invertebrates important to juvenile salmonids.

Invertebrate Prey Resource Production

Biological Success Criterion 8
Production of invertebrate prey taxa known to be important to juvenile salmonids should be comparable to that of appropriate reference sites at the end of ten years.

Project Sites
This criterion will be applied to all four project sites.

Monitoring Tasks
Sampling protocols for fallout insects (insects produced on riparian and marsh vegetation that fall or drift into the water column) and benthic invertebrate are well described by Cordell et al. (1994, 1999) and have been extensively applied and refined at other Duwamish River restoration sites. To summarize, fallout insects are sampled by use of floating plastic bins distributed throughout a project site. Benthic invertebrates are best sampled with cores taken to a depth of 10 cm. Cordell recommends a minimum of 10 replicates in each "stratum"; strata include mud or sand flats and areas of marsh vegetation. Taxa known to be important to juvenile salmonids are identified to species

and enumerated, the remainder are identified to order level.

In addition to evaluating prey resource productivity of the intertidal habitat restoration projects, this task will also be used to screen for sediment contamination. The overall productivity of the sites, as well as a community level analysis will be used to determine whether there is indication of sediment contamination that warrants more detailed site investigation. The composition of the benthic organism community will be analyzed to determine if pollution tolerant species are present in abundance.

Contingency Measures
Failure to invertebrate prey taxa criteria would indicate that fundamental EB/DRP goals are not being met. While the specific causes are difficult to project at this point, an examination of the project design, implementation, and site management would be warranted. Outside expert assistance may be obtained in evaluating the monitoring data and project performance. If the benthic community does not appear to be healthy, sediment quality sampling may be initiated to determine if contamination is responsible for the problem. Lack of a productive benthic community could indicate inadequate physical conditions on site, such as unsuitable sediment grain size or excessive wave energy and scouring. Lack of fallout insects could indicate problems associated with riparian or marsh vegetation.

Discussion
See discussion under "Fish Access/Presence".

Benthic organisms, in constant contact with the sediments at the restoration sites, may provide an indication of sediment contamination. Because sediment chemistry analysis been determined to be unwarranted by the Panel, analysis of the benthic community provides a surrogate and trigger for more detailed studies of sediment quality.

Table One: Success Criteria Summary and Site Applicability

Criteria Category	Success Criteria	Applicable Sites
Physical Success Criteria		
Intertidal Area	Physical Success Criterion 1: The total restored area between an elevation of +12.0 ft. MLLW and -2.0 ft. MLLW will be at least 90% of the target intertidal elevation for each site.	ALL
Tidal Regime	Physical Success Criterion 2: Tidal amplitude, as determined by both timing and elevation of high and low tide events, is equivalent inside and outside of the project area.	Seaboard, Hamm Creek, North Wind's Weir
Slope Erosion	Physical Success Criterion 3: No evidence of erosion that threatens property, infrastructure, or is otherwise unacceptable is observed after a period of initial site stabilization.	ALL
Sediment Structure	Physical Success Criterion 4: Over time, sites will accumulate fine grained material and organic matter. This would be evidenced by a decrease in mean grain size, and an increase in organic carbon, in surface sediments.	ALL
Sediment Quality	Physical Success Criterion 5: No evidence of contamination due to sediment transport or on-site migration of upland contaminants to groundwater or aquatic area.	primarily Seaboard, other sites as needed
Biological Success Criteria		
Marsh Vegetation Establishment	Biological Success Criterion 1: The areal extent (percent cover) of vegetation should be stable or increasing within portions of the project site with elevations suitable to marsh establishment. Biological Success Criterion 2: Species composition of native wetland plant species should be comparable to that of appropriate reference sites, and should not contain greater than 1% cover by area by non-native or invasive plant species. Biological Success Criterion 3: Plant vigor, as measured by stem height and shoot density, should be comparable (greater than 80%) to that of appropriate reference sites and/or improving over time.	ALL

Criteria Category	Success Criteria	Applicable Sites
Riparian Vegetation Establishment	Biological Success Criterion 4: Areal extent of riparian vegetation (native trees and shrubs) should be stable or increasing over time, and cover not less than 90% of the upland vegetated area of each project site at the end of ten years. Invasive plant coverage should be minimal. [see Table associated with this criterion for % cover objectives for vegetation layers] Biological Success Criterion 5: Survival of riparian plantings in each cover class category (herb, shrub, trees) should be at least 75% at the end of three years.	ALL
Bird Use	Biological Success Criterion 6: Use of the restoration sites and the area within 50 meters of the site by indigenous/native bird species should be comparable of that to appropriate reference sites.	ALL; projects will be sampled as part of 2 geographic areas – Kellogg Island or Turning Basin
Fish Access/Presence	Biological Success Criterion 7: Estuarine fish will access the project sites. Juvenile salmonid presence within the project sites should be comparable to that of appropriate reference sites at the end of ten years.	ALL
Invertebrate Prey Resource Production	Biological Success Criterion 8: Production of invertebrate prey taxa known to be important to juvenile salmonids should be comparable to that of appropriate reference sites at the end of ten years.	ALL

Monitoring Program Management

Monitoring Program Responsibility

By Panel resolution, the USFWS has been given the overall responsibility for implementing this monitoring program. The responsibility includes the design and implementation of monitoring tasks, data management, preparation of monitoring reports, and distribution of products. Also by resolution of the EB/DRP Panel, funds necessary to cover the anticipated costs of monitoring program implementation will be transferred from the court registry account to the Department of the Interior NRDA Restoration Fund. The design and implementation activities are considered separate from the role of USFWS as a Panel member in its capacity as a natural resource trustee.

Monitoring Program Implementation

According to schedules provided to EB/DRP from entities responsible for construction of the four intertidal habitat restoration projects covered under this monitoring program, all aspects of project implementation should be complete by the late fall, 2000. It is anticipated that year 1 monitoring tasks will begin in January 2001, and end in December 2001. Similarly, future monitoring years will be equivalent to calendar years (ie. begin in January, end in December). The final year of monitoring is scheduled in post construction year 10, or the year 2010.

To the extent practicable, volunteer stewardship groups and conservation organizations will be used to carry out some of the tasks identified in this monitoring program. This relates in part to controlling monitoring program costs. The greater benefit and motivation, however, rests on the belief that volunteer stewardship and conservation organizations' involvement will foster community support for and stewardship of the completed restoration projects.

USFWS will oversee training of the volunteer monitors and retains responsibility for the quality of the data. Where it is not feasible for reasons of data QA/QC, complexity of the monitoring task(s), or safety, USFWS personnel or their contractors will complete monitoring tasks. If contractors are utilized, USFWS will hold the contractors responsible for data quality control, and will itself retain responsibility for quality assurance through management of contracts and review of draft reports.

Monitoring Program Reports

In each year of substantial monitoring activity (years 1,2,3,5,7,and 10), USFWS will prepare a report which presents a summary and evaluation of the monitoring program results. At a minimum, the report will summarize:

1. Monitoring tasks completed (methods, sampling locations, dates);
2. Data and other monitoring results;
3. Status of project sites;
4. Trends in data, for both individual sites and the overall program;
5. "Red flags" indicating need for consideration of contingency measures;
6. Externalities that may be influencing monitoring results; and
7. Recommendations and alternatives for action.

A draft report will be distributed to Panel members for their review and comment within

three months of the completion of an annual sampling period. When necessary, a meeting of the Panel of Managers will be called to present monitoring program results and discuss the implications, including need for contingency measures. Responsibility for completion of contingency measures identified as necessary by the Panel would rest with the land owner and/or project manager. A final report incorporating Panel member comments and identified contingency measures will be prepared for distribution. Recipients of final reports will include, in addition to Panel members, other interested agencies and permitting authorities, as well as members of the public or other parties who have requested copies of the report.

USFWS will distribute monitoring program results, including responding to requests for copies of the reports, to the fullest extent practicable. In order to facilitate widespread distribution while controlling printing costs, USFWS will explore options for distribution through the internet and other means. Feasible options will be discussed with the Panel.

Scientific Research Activities

The express purpose of this monitoring program is to evaluate progress in achieving EB/DRP goals and objectives. Funds for the habitat development program are limited, and there is much interest in applying as much funding as possible to achieving on the ground results. However, the Panel recognizes its responsibility for project follow through, including monitoring. Necessarily, the monitoring program is therefore limited in scope to addressing the important question of project performance.

The EB/DRP Panel of Managers also recognizes the inherent scientific interest in these projects and activities. There exists some responsibility on the part of the Panel to build the body of knowledge, and to provide future restoration programs with the benefit of the lessons we have learned. The Panel encourages research activities that utilize the monitoring data as background, but are beyond the scope of this program. Towards this end, EB/DRP will make available all monitoring program data and provide other support where feasible. Land owners of habitat sites will be encouraged to accommodate scientific research activities, where these activities do not interfere with the habitat objectives of EB/DRP. Finally, efforts will be made to provide scientific presentations of project results to relevant professional society organizations, and/or publications in peer-reviewed scientific journals.

Modifications of the Monitoring Program

An important purpose of this report is to "institutionalize" an approach to project monitoring as agreed upon by the EB/DRP Panel. Given the long-term nature (10 years post-construction) of the monitoring program, it is important to provide a clear description of the program. It is also important to maintain a continuous data series that allows for inter-site and inter-annual comparisons. In addition to the need for long-term monitoring program consistency, it is also important to recognize a potential need to modify the program.

At least three types of changes to the monitoring program can be envisioned at this point.

1. Changes in monitoring tasks. Over the five year period of monitoring restoration projects completed under the Coastal America program, improvements in field and laboratory techniques have led to changes in monitoring task protocols

(Cordell et al. 1994, 1996, 1997, 1999). While the current monitoring program builds on this experience, it is likely that other opportunities for improvement will be identified which should be incorporated into the monitoring program.

2. Elimination of monitoring tasks. It is possible that in the future, the EB/DRP Panel might reach consensus that specific success criteria have been met, and that associated monitoring tasks could cease. Similarly, it could be determined that a monitoring task was not returning useful information, and therefore not worth the expense of continuation.

3. Modification of project objectives. In describing the application of adaptive management principles to coastal restoration projects, Thom (1997) suggests that modifying project objectives during the monitoring period is a reasonable alternative. Unrealistic expectations or inaccurate assumptions can lead to establishment of inappropriate project objectives. While considerable effort has gone into the development of success criteria for the EB/DRP monitoring program, it is possible that a decision to modify might be reached based on program results.

Therefore, it is acknowledged that it is necessary to strike a balance between a monitoring program that provides long-term consistency and comparability and real-word practicability. The potential need to modify this program in the future is recognized by the EB/DRP Panel.

Monitoring Program Budget

The budget presented in Table Two provides costs for activities conducted pursuant to physical and biological success criteria and monitoring tasks and report preparation and distribution as discussed in the Monitoring Program. Costs are identified for personnel and supplies by the year, beginning with year 1 of the monitoring program and ending in year 10. The budget assumes a 3% inflation rate. A detailed estimation of resources (personnel, materials) required for each task is presented in Appendix B.

The total estimated cost of monitoring activities identified for the four intertidal habitat restoration projects undertaken by the Panel is $699,720. Figure One shows a breakdown of monitoring program costs by category. The estimated upper limit on USFWS Regional Office administrative costs (ie. overhead) is $21,497, bringing the estimated project total to $721,217.

It should be noted that if annual increases in inflation as high as 8% occur total, estimated costs for implementing the full monitoring program would be. While interest that is anticipated to accrue on monitoring program funds is projected to cover this potential increase in project costs, procedures for managing budget shortfalls (and surplus) will need to be worked out between USFWS and the EB/DRP Panel.

Table Two: EB/DRP Intertidal Habitat Projects Monitoring Program Budget

Criteria / Task	Biodays /site	Techdays /site	# sites	total personnel	materials /supplies	total 1st year	total year 2	total year 3	total year 5	total year 7	total year 10	subtask total
Intertidal Area												
establish +12 ft. benchmark	1.00	1.00	4.0	$3,048	$50	$3,098	$0	$0	$0	$0	$0	
select +12 or greater tide event when water reaches benchmark												
map perimeter of water edge w/ GPS		0.50	4.0	$508		$508	$523	$539	$572	$607	$663	
prepare map, calculate intertidal area		0.50	4.0	$508		$508	$523	$539	$572	$607	$663	
establish permanent transects	1.00	1.00	4.0	$3,048		$3,048	$0	$0	$0	$0	$0	
note topo & habitat breakpoints												
acquire x-section elev. data		1.00	4.0	$1,016		$1,016	$1,046	$1,078	$1,144	$1,213	$1,326	
acquire low tide aerial photos					$2,500	$2,500	$2,575	$2,652	$2,814	$2,985	$3,262	
digitize, geo-reference, import to GIS	0.50		4.0	$1,016		$1,016	$1,046	$1,078	$1,144	$1,213	$1,326	
overlay GPS & x-section data		1.00	4.0	$1,016		$1,016	$1,046	$1,078	$1,144	$1,213	$1,326	
TASK SUBTOTAL						*$12,710*	*$6,761*	*$6,964*	*$7,388*	*$7,838*	*$8,565*	***$50,225***
Tidal Regime												
acquire tide gauges		0.33	3.0	$254	$2,550	$2,804	$0	$0	$0	$0	$0	
install and survey	0.50	0.50	3.0	$1,143	$0	$1,143	$0	$0	$1,286	$0	$0	
download monthly		4.00	3.0	$3,048	$0	$3,048	$3,139	$0	$3,331	$0	$0	
TASK SUBTOTAL						*$6,995*	*$3,139*	*$0*	*$4,617*	*$0*	*$0*	***$14,752***
Slope erosion/accretion												
establish photopoints	0.25	0.25	4.0	$762		$762	$0	$0	$0	$0	$0	
monitor quarterly		1.00	4.0	$1,016	$100	$1,116	$1,149	$1,184	$1,256	$1,333	$1,456	
TASK SUBTOTAL						*$1,878*	*$1,149*	*$1,184*	*$1,256*	*$1,333*	*$1,456*	***$8,256***
Sediment structure												
collect 10 cores @ site		0.50	4.0	$508		$508	$523	$539	$572	$607	$663	
upper (>+10) and lower (<+9)						$0						
analyze grain size		1.00	4.0	$1,016	$400	$1,416	$1,046	$1,078	$1,144	$1,213	$1,326	
analyze organic content		1.00	4.0	$1,016		$1,016	$1,046	$1,078	$1,144	$1,213	$1,326	
TASK SUBTOTAL						*$2,940*	*$2,616*	*$2,695*	*$2,859*	*$3,033*	*$3,314*	***$17,457***

Criteria	Task	Biodays /site	Techdays /site	# sites	total personnel	materials /supplies	total 1st year	total year 2	total year 3	total year 5	total year 7	total year 10	subtask total
Sediment quality													
	Install groundwater monitoring wells					$6,500	$6,500	$0	$0	$0	$0	$0	
	Groundwater sampling and analysis					$6,500	$6,500	$0	$0	$0	$0	$0	
	Well closure					$1,000	$1,000	$0	$0	$0	$0	$0	
	TASK SUBTOTAL						*$14,000*	*$0*	*$0*	*$0*	*$0*	*$0*	***$14,000***
Marsh vegetation													
	use aerial photos												
	delineate marsh veg. cover	0.50	1.50	4.0	$2,540		$2,540	$2,616	$2,695	$2,859	$3,033	$3,314	
	OR												
	use GPS												
	delineate marsh veg. cover												
	use permanent transects												
	sample w/ quadrats												
	ID plant spp.												
	est. % cover	0.50	0.50	6.0	$2,286		$2,286	$2,355	$2,425	$2,573	$2,730	$2,983	
	measure stem height	0.25	0.25	6.0	$1,143		$1,143	$1,177	$1,213	$1,286	$1,365	$1,491	
	measure shoot density	0.25	0.25	6.0	$1,143		$1,143	$1,177	$1,213	$1,286	$1,365	$1,491	
	TASK SUBTOTAL						*$7,112*	*$7,325*	*$7,545*	*$8,005*	*$8,492*	*$9,280*	***$47,759***
Riparian vegetation													
	use aerial photos												
	delineate riparian veg. cover		0.50	4.0	$508		$508	$523	$539	$572	$607	$663	
	OR												
	use GPS												
	delineate riparian veg. cover												
	use permanent transect												
	est. % survival along transect	0.25	0.50	4.0	$1,016		$1,016	$1,046	$1,078	$1,144	$1,213	$1,326	
	TASK SUBTOTAL						*$1,524*	*$1,570*	*$1,617*	*$1,715*	*$1,820*	*$1,988*	***$10,234***
Bird use													
	establish observation points	0.50	0.50	2.0	$762		$762	$0	$0	$0	$0	$0	
	monitor quarterly		4.00	2.0	$2,032		$2,032	$2,093	$2,156	$2,287	$2,426	$2,651	
	TASK SUBTOTAL						*$2,794*	*$2,093*	*$2,156*	*$2,287*	*$2,426*	*$2,651*	***$14,407***

Criteria	Task	Biodays /site	Techdays /site	# sites	total personnel	materials /supplies	total 1st year	total year 2	total year 3	total year 5	total year 7	total year 10	subtask total
Fish use													
	determine sample methods	1.00	1.00	4.0	$3,048		$3,048						
	sample for fish access												
	deploy block nets					$3,000	$3,000	$0	$0	$0	$0	$0	
	2x/mo. 1 Mar - 15 June												
	id, measure, release	8.00	8.00	6.0	$36,576		$36,576	$37,673	$38,803	$41,167	$43,674	$47,723	
	TASK SUBTOTAL						*$42,624*	*$37,673*	*$38,803*	*$41,167*	*$43,674*	*$47,723*	***$251,664***
Prey resource production													
	sample fallout insects												
	deploy float traps					$200	$200	$0	$0	$0	$0	$0	
	1x/mo. 1 Mar - 15 June	1.00	2.00	6.0	$6,096		$6,096	$6,279	$6,467	$6,861	$7,279	$7,954	
	id, enumerate		4.00	6.0	$6,096		$6,096	$6,279	$6,467	$6,861	$7,279	$7,954	
	sample benthic inverts					$200	$200	$0	$0	$0	$0	$0	
	collect core samples	1.00	2.00	6.0	$6,096		$6,096	$6,279	$6,467	$6,861	$7,279	$7,954	
	1x/mo. 1 Mar - 15 June												
	id, enumerate		4.00	6.0	$6,096		$6,096	$6,279	$6,467	$6,861	$7,279	$7,954	
	TASK SUBTOTAL						*$24,784*	*$25,116*	*$25,869*	*$27,444*	*$29,116*	*$31,816*	***$164,144***
Reporting													
	Data preparation	10.00	20.00	1.0	$10,160		$10,160	$10,465	$10,779	$11,435	$12,132	$13,256	
	Report preparation	10.00	10.00	1.0	$7,620		$7,620	$3,924	$4,042	$4,288	$4,549	$4,971	
	Printing & distribution		5.00	1.0	$1,270	$100	$1,370	$1,411	$1,453	$1,542	$1,636	$1,788	
	TASK SUBTOTAL						*$19,150*	*$15,800*	*$16,274*	*$17,265*	*$18,317*	*$20,015*	***$106,822***
PROJECT EXPENSES (assumes 3% inflation rate)							**$136,511**	**$103,243**	**$103,107**	**$114,003**	**$116,048**	**$126,808**	***$699,720***
REGIONAL OFFICE OVERHEAD							$ 11,826	$4,168	$1,935	$1,140	$1,160	$1,268	***$21,497***
PROJECT TOTAL							**$148,337**	**$107,411**	**$105,042**	**$115,143**	**$117,208**	**$128,076**	***$721,217***

NOTE: The following figures are to demonstrate the effect of inflation rate on project expenses.

PROJECT EXPENSES (assumes 8% inflation rate)	**$108,255**	**$113,360**	**$137,618**	**$154,225**	**$194,279**	***$844,248***

Figure One: Breakdown of Monitoring Program Budget by Category