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[EXTERNAL] Scoping comments for Coastal Plain Oil and Gas Leasing EIS (Richard Sumner)

1 message

Rich Sumner <richardrsumner@comcast.net>
To: blm_ak_coastalplain_eis@blm.gov

Sat, Apr 28, 2018 at 10:46 AM

Dear NEPA Scoping Official,

Please find attached my scoping comments for the Coastal Plain Oil and Gas Leasing EIS. They provide technical suggestions on use of a risk-based assessment framework for the EIS. If appropriate, please share the comments with the technical lead for the EIS. She or he may contact me if they have questions or would like to delve into details.

Best regards,

Rich Sumner

541.602.7589

Corvallis, Oregon



Sumnercomment CoastalPlainEISscoping.pdf
1435K

April 28, 2018

1525 NW 14th Street
Corvallis, Oregon 97330

NEPA Scoping Official
BLM Alaska State Office
222 West 7th Avenue
Anchorage, Alaska 99513

Re: Coastal Plain Oil and Gas Leasing Program EIS Scoping

Dear NEPA Scoping Official,

I respectfully submit the following comments in response to the Bureau of Land Management's Notice of Intent to Prepare an Environmental Impact Statement (EIS) for the Coastal Plain Oil and Gas Leasing Program, Alaska, 83 Fed. Reg. 17562 (April 20, 2018).

My comments outline an approach for helping (a) guide the development of oil and gas leasing alternatives, and (b) consider and analyze the potential environmental impacts of those leasing alternatives. The approach, also called an "assessment framework," relies on a risk-based type of analysis with the objective to properly balance oil and gas development with existing uses and conservation of surface environmental resources in the proposed leasing area.

Proper balance is achieved when adverse impacts to the environmental resources is offset with mitigation implemented with a known level of certainty of its effectiveness.

I only offer a general outline of the assessment framework. I have training material that elaborates on various parts of the framework. I have attached below sections of two particular "training notes." Attachment 1 describes how to assess indirect impacts, as will likely be associated with individual projects for oil and gas field development (e.g., roads, pipelines and drill pads). Attachment 2 explains how "weight of evidence" is used in to assess impacts caused by large scale projects (e.g., oil and gas unit development). I will freely share other training notes should the Bureau wish to explore the framework in greater detail.

Risk-Based Assessment Framework for a Coastal Plain Oil and Gas Leasing Program EIS

An "assessment framework" means a way that technical information about a project (e.g., oil and gas leasing program) is acquired, interpreted and reported to make a determination and decision about that project. For purposes of this EIS scoping, the framework can focus on the "environmental risk" posed by oil and gas exploration and development in the proposed leasing area. Environmental risk is characterized using three parameters: The intensity, duration and proximity of stress applied to environmental resources by development activity.

Risk takes into account both the direct and indirect impacts that assessed stress has on valued environmental resources. Environmental risk can be offset by opportunity for mitigation of impacts. "Weight-of-evidence" is used to characterize the overall "magnitude" of risk attributed to project alternatives (i.e., considering impacts alongside mitigation opportunity).

Weight of evidence means a logic-flow used to describe, “sieve” and align independent pieces of information that are used to make a determinations of impact and mitigation needs. Weight-of-evidence is particularly suited to situations where quantitative impact models are absent or they generate results of low quality (high uncertainty). Combining various lines of evidence reduces the chance of making erroneous conclusions based on a single line of evidence (e.g., only relying on numerical models with limited accuracy). It also allows for a balanced consideration and merging of different types of information, thereby building greater understanding of potential environmental impacts. The tables in Attachment 2 provide an example of how the results a weight of evidence analysis can be presented in an EIS.

A landscape-scale approach (i.e., watershed approach) also can be applied to help characterize the risk of multiple, individual exploration/development impacts across a large geographical area. Key to the landscape approach is the preparation of “watershed profiles” and “habitat use profiles” for mapped geographical parts of the proposed leasing area. The profiles depict the relative abundance, diversity (including connectivity) and condition of geographically-classified aquatic areas and vegetation patches in those areas. Ecosystem classification systems are used to help build and tally the profiles (e.g., “*Pre-ABOVE: Land Cover and Vegetation Map, Arctic National Wildlife Refuge*,” https://daac.ornl.gov/ABOVE/guides/Arctic_Wildlife_Refuge_Veg_Map.html).

Wildlife habitat occurrence maps also can be used as part of the classification process (e.g., *See: ANWR Revised Comprehensive Conservation Plan, Map 4-9, Page 4-108, “Porcupine Caribou Herd Calving Areas”*).

Analysis then can focus on how much the direct and indirect impacts from exploration and development might change the profiles, and thereby pose a risk to environmental resources that are supported by the profiles. The profiles are correlated to landscape functioning/processes. Mitigation opportunities are also analyzed to determine if there is sufficient opportunity to offset impacts. This overall approach of analysis provides for the assessment of cumulative impacts of individual oil and gas development projects (e.g., gravel pads, pipelines and roadways).

Similar profiles, based existing “occurrence” maps, can be generated to help in the assessment of cumulative impacts to human subsistence uses and the experiential wilderness qualities of the Coastal Plain.

Descriptions of Plausible Oil and Gas Leasing Alternatives

The process of leasing (project) alternatives can begin by (a) describing the affected landscape (leasing area) in terms of having broad-scale assessment areas, (b) building watershed/habitat profiles for those areas and, and (c) describing the environmental resources (landscape functions/wildlife use) attributed to the profiles. The next step is envisioning a typical, geographical pattern of oil and gas development for the lease area. That pattern of development (“typical development” scenario) can be viewed in conjunction with the described watershed/habitat profiles. Then, synoptic consideration is given to the intensity, duration and proximity of possible individual project impacts (stress) to the profiles. Likely to emerge from this analysis are three main types of leasing (project) alternatives.

1. A “typical development” scenario showing oil and gas development across all portions of the leasing area identified as having high potential for occurrence of oil and gas reserves. Best management practices specified for individual project activities (e.g., roads, pads, pipelines, production facilities) are assumed to be applied across the entire

lease area. “BMPs” include adaptive management procedures and mitigation, including compensatory mitigation. The “BMPs” generally focus on controlling the intensity of impact. The Kuparuk Oil Field could serve as a template for a typical development scenario.

2. A “constrained development” scenario showing broad geographical areas where development is precluded. Those areas can be considered as compensatory mitigation areas (i.e., “preservation type mitigation”) dedicated to offset unavoidable impacts (risk) in other areas designated for development (where BMPs are also applied). This scenario emphasizes controlling both the intensity and proximity of impacts to valued environmental resources.

3. A “constrained and phased development” scenario showing time-phased development in designated development areas alongside mapped development preclusion areas. Exploration and develop would proceed first in the least risky parts of the proposed “unconstrained” leasing area. A feature of this alternative is increased emphasis on adaptive management practices. The practices are closely tied to project compliance and mitigation effectiveness monitoring. This scenario emphasizes controlling the intensity, proximity and duration of impacts to valued environmental resources.

Project alternatives can include subcomponents that draw from other described or envisioned alternatives.

Environmental Analysis of Project Alternatives

An environmental analysis of project (leasing) alternatives can be conducted by assessing, and then evaluating, the environmental risks attributed to each alternative. An analysis of indirect impacts caused by individual oil and gas development projects (e.g., wells, roads, pipelines) will need special attention. Attachment 1 describes how risk assessment principles can be applied to conduct such a review. Likewise, cumulative impacts also will need special attention. Attachment 2 describes how that review can be conducted. Its tables show visually how to: (1) Compare the relative “significance” of impact (risk) attributed to each project alternative, (2) compare the opportunity to mitigate assessed impacts attributed to each alternative, and (3) show whether a particular alternative poses risk of significant degradation of the environment.

I realize that my overview of a suggested assessment framework is a very “dense” in its wording. The challenge in using a risk-based assessment framework is making it simple enough to help top government leaders make a reasoned decision on the deployment of an oil and gas leasing program for the Coastal Plain of Arctic National Wildlife Refuge. I hope that presenting risk-based information in the form of relatively simple maps, profiles and color-coded tables will help the process. Please feel free to contact me if you have questions or suggestions about the described assessment framework.

Sincerely,

(E-signature and emailed April 28, 2018)

Richard Sumner
richardrsumner@comcast.net
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ATTACHMENT 1

Regulatory Training Note #2

ASSESSMENT OF INDIRECT IMPACTS AND MITIGATION NEEDS FOR SMALL SCALE PROJECTS

1.0 Purpose of Note

This training note was prepared to accompany a training presentation for state and federal regulators involved in the permitting of dredge and fill activity. The presentation describes a watershed approach for regulating projects. Emphasis is placed on the role of assessment and monitoring to guide decisions. This particular training note describes circumstances when mitigation may be required to offset indirect impacts attributed to small scale projects.

Small scale projects mean proposed development activity that is not expected to degrade a landscape that is greater in size than a project watershed area. In contrast, a large scale project poses risk to a landscape area that is a magnitude larger than a project watershed area. A project watershed area means a watershed or part of a watershed that encompasses a project site. Its geographical boundaries are defined based on land cover composition, topographic elevations, and ecoregion setting. A project watershed area is generally smaller than a 10-digit HUC watershed.

2.0 Background

The Clean Water Act Section 404(b) (1) Guidelines specify that factual determinations be made about the extent of a project's impacts, including secondary and cumulative effects. Section 230.11(h) of the Guidelines explains that:

“Secondary effects are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material.”

Subpart H of the Guidelines addresses compensatory mitigation. The Guidelines do not differentiate the categories of impacts in its specification for compensatory mitigation to offset losses of aquatic resource functions and condition. This training note is intended to assist regulators in situations when indirect impacts are identified as a specific concern.

3.0 Overview of Indirect Impacts

For purposes of this training note, indirect impacts occur when a discharge of fill material into an aquatic resource causes a corresponding loss or degradation of aquatic resources beyond the footprint of a fill, and within a project watershed area. Direct impacts are often described as those impacts attributed to the “footprint” of a fill.

Indirect impacts to aquatic areas may be caused by a:

1. Disruption of hydrological flow (i.e., hydromodification),
2. Discharge of pollutants caused by fill or related development activity (e.g., sediment in stormwater), and
3. Fragmentation of landscape/habitat patches, including disturbance to the movement and migration of aquatic dependent species.

In essence, indirect impacts result from a break in the connectivity of aquatic resources in a landscape area that is caused by a discharge of fill material.

The amount of indirect impact and its environmental effect is predicted based on four (4) assessment factors:

1. The proximity of the footprint of the fill to nearby aquatic resources (i.e., “extent of impact”).

In general, the maximum “*assessment area for indirect impacts*” of small scale projects is fixed at 300-foot distance outward from the footprint of a proposed project fill. The 300 foot distance roughly correlates to buffer widths identified in the technical literature as having an optimal beneficial effect on aquatic resources (i.e., minimize disturbance to wildlife). Also, the standard stream assessment area (segment) used in ambient monitoring is 30 (stream widths) multiplied by average stream width in a survey region. The assessment area is intended to account for a stream’s capacity to ameliorate minor local impacts. For purposes of this note a typical stream bank full channel width is 10 feet, thus making the assessment area for indirect impacts equal to 300 feet of stream length.

The maximum assessment area of indirect impacts may be increased beyond 300 feet from the footprint of a fill (within a stream or wetland) if the proposed fill disrupts the connectivity of aquatic resources within a broader patch of landscape.

For example, a proposed fill may pose a risk of diverting flow from an intact headwater network of streams and springs. This type of impact can alter flow duration far more than 300 feet downstream from the impact site, and thereby causing aquatic resource degradation (e.g., dewatering). Predicting the spatial extent of indirect impacts in that situation takes into account the ecological sensitivity of affected aquatic resources and characteristics of their landscape connectivity. Landscape connectivity is examined in terms of hydrology flow pathways, and the movement/dispersal patterns of aquatic dependent organisms.

2. The type of aquatic resource(s) affected by indirect impacts.

Some types of aquatic resources and their functions are more susceptible to indirect impact given their ecological structure, location in a watershed area and prevalence of

occurrence in a watershed area. For example, forested slope wetlands can be highly susceptible to hydromodification caused by flow diversions. Also, some types of habitat associated with an aquatic resource are more susceptible to impact (e.g., special status species habitat). The “type” of aquatic resource, and its position within a landscape, will reflect the nature of its connectivity with other aquatic resources.

3. The ecological condition of aquatic resources affected by indirect impacts.

An aquatic resource in “good condition” is presumed to be at higher risk from indirect impacts than other condition classes (e.g., “fair” and “poor”) because of a threat of loss of presumed higher rates of ecological function. Also, there is substantial uncertainty that a mitigation project (aquatic resource) used to offset indirect impacts will attain “good condition.”

Condition may be assessed using mapped (“Level 1”), rapid (“Level 2-RAM”) or more intensive procedures (“Level 3”) depending on the expected type of indirect impacts and corresponding environmental effects.

4. The intensity and duration of stress generated by a fill and its associated project activity to an area of indirect impact.

Consideration is given to whether the stress is continuous or episodic, and the portion of the indirect impact assessment area affected by the stress. In particular, three general types of stressors are evaluated as highlighted in Section 2.0:

- (a) Hydromodification (affecting timing, duration and flow of water),
- (b) Pollutants/pollution, and
- (c) Fragmentation of landscape/habitat patch.

The three types of stressors may have an individual as well as a cumulative adverse effect on aquatic resource condition, aquatic habitat quality and on the provisioning of ecosystem services.

The amount of indirect impacts is expressed as a narrative rating that corresponds to the risk of aquatic resource degradation of condition.

“High” risk means a likely detrimental conversion from an existing aquatic resource type to another land cover/habitat type(s) across the entire indirect impact assessment area, or degradation of an aquatic resource(s) from “good” to lesser condition across the entire area.

“Moderate” risk means a likely detrimental lowering of aquatic resource condition from “good” to a lower condition class over more than half of the assessment area.

“Low” risk means little likelihood of conversion to a different, less desired type of aquatic resource or degradation to a lower condition class in the assessment area. Low risk may include increased potential for a “positive” type conversion or improvement in site condition.

4.0 Assessment of Indirect Impacts

Indirect impacts are assessed whenever the permitting authority requires an alternatives analysis for a project, and that analysis entails a reporting of the amount of impacts for each project alternative.

A weight of evidence approach is used to assess the risk to aquatic resources posed by an indirect impact from a project fill and associated project activities. A decision table is used to help evaluate the amount of risk based on consideration of the four key assessment factors described in Section 3 (See Table 1).

Number of stressors affecting majority of assessment area (considering intensity/duration) (See Section 2.4) ↓	“Before” condition of aquatic resource affected by indirect impact* Also, specify type of aquatic resource and sensitivity to impact: <i>Type _____ High Sensitivity to Impact?</i> <i>Yes/No</i> <i>(Provide justification about sensitivity)</i>		
	Poor Condition	Fair Condition	Good Condition
One type	Low risk	Low risk	Moderate risk
Two types	Low risk	Moderate risk	High risk
Three types	Low risk	High risk	High risk
<i>* The condition of aquatic resource affected by an indirect impact is presumed comparable to the condition of the aquatic resource that is directly impacted, unless otherwise indicated by landscape conditions (i.e., land use).</i>			

Table 1 - Decision table for assessing risk from indirect impacts

The decision table includes preliminary narrative scores that may be attributed to the risk caused by indirect impacts (e.g., “moderate risk”). Adjustments to the preliminary scores may be made based on the specific circumstances of a proposed project and its affected aquatic resources.

The following sequence of steps helps complete the table and make adjustments to its rating scheme:

- a) Demarcate a 300’ or greater impact assessment area for the affected aquatic resource(s) (*Assessment Factor 1*).
- b) Based on technical experience, decide whether the affected aquatic resource(s) are highly sensitive to impact (*Assessment Factor 2*)

- c) Determine the condition of affected aquatic resource(s) (*Assessment Factor 3*), and
- d) Predict intensity/duration of impact caused stressors (*Assessment Factor 4*).

For example, a “sensitive” vernal pool system in good condition is located within the 300 foot assessment area for indirect impacts. “Fragmentation of landscape patch” may be the only project stressor that will likely affect that aquatic resource. However, the vernal pool system, itself, is located in a broader vernal pool landscape setting that is relatively undisturbed. In that situation, and because the vernal pool system has a high sensitivity to impact, the assessment may result in a “high risk” score despite there being only one type of stressor.

In contrast, a slope wetland in good condition is located within the assessment area for indirect impacts. A proposed project may pose a risk because of hydromodification and pollutants (e.g., “two types” of stressors associated with stormwater). However, the geomorphology of the assessment area may reveal a lack of hydrological connectivity between the project site and the wetland. In that situation the risk may be scored as “moderate” or perhaps “low.”

Other adjustments may be made to scoring based on occurrence of special status species in the assessment area for indirect impacts. For example, an adjustment may be made if the footprint of a fill blocks movement or dispersal of a special status species over an extended area.

5.0 Assessing Indirect Impacts for Alternatives Analysis

The rigor of assessment for indirect impacts is commensurate with the scope of a proposed project and broader risks it may pose to the aquatic environment. For most routine alternatives assessments, indirect impacts may be reported using coarse estimates of:

- a. Aquatic resource type,
- b. Relative abundance of aquatic resource type in a project watershed area,
- c. Condition of aquatic resource, and
- d. Assessed (“ranked”) risk to the impact assessment area.

Coarse estimates may be made using “Level 1” map information.

6.0 Assessing Indirect Impacts for Compensatory Mitigation

Compensatory mitigation may be required to offset predicted indirect impacts. The weight of evidence approach described in this training note describes a way of predicting those impacts.

However, when making a determination about whether there is need for compensation, consideration also is given to whether the indirect impacts will likely be offset by the “indirect environmental benefits” attributed to proposed mitigation project site(s). Indirect benefits are derived from the “functional/condition” lift of a mitigation project site, and its ensuing support of watershed processes and needs. Indirect benefits can also be thought of as “offsite benefits.”

In other words, a determination of need for mitigation of indirect impacts is based on a comparison of the predicted risk of indirect impact, and the predicted indirect benefits from a proposed mitigation site. A presumption of this comparison is that the proposed mitigation site will attain good condition as assessed using performance standards.

Compensatory mitigation for indirect impacts will not likely be required for most minor permitting actions that require compensation for direct impacts. In those situations, the indirect environmental benefits of mitigation typically offset the adverse effects of an indirect impact. However, permitting actions involving substantial indirect impacts or highly sensitive aquatic areas may require specific mitigation for indirect impacts.

For example, there are situations where vernal pools located within an assessment area for indirect impacts may be degraded because of hydromodification. There is also the possibility that existing vernal pools located near a vernal pool mitigation site, proposed to offset direct impacts, will benefit through increased ecological connectivity within a broader watershed area. Under this scenario there is likely no need for additional compensatory mitigation of indirect impacts.

In contrast, there may be a situation where a proposed project bisects a relatively intact vernal pool landscape area, and where proposed vernal pool mitigation does not build connectivity within its broader project watershed area. Under that scenario there likely is a need for compensatory mitigation for indirect impacts.

A second decision table (Table 2) may be used to assess the indirect benefits of a compensatory mitigation project. As with Table 1, adjustments may be made to the preliminary scores based on the specific circumstances of a proposed mitigation project and its affected aquatic resources.

Number of stressors controlled or removed over majority of mitigation area	“Before” condition of aquatic resource to be mitigated and with performance standards to attain “good condition.”		
	Good	Fair	Poor
One type	Low benefit	Low benefit	Moderate benefit
Two types	Low benefit	Moderate benefit	High benefit
Three types	Low benefit	High benefit	High benefit
* The condition of aquatic resource affected by an indirect benefit is presumed comparable to the condition of the aquatic resource that is being mitigated (e.g., restoration site), unless otherwise indicated by landscape conditions (i.e., land use).			

Table 2 - Assessing indirect benefits of mitigation

6.1 Determining Mitigation Ratios for Indirect Impacts

Where available, Corps of Engineers mitigation ratio setting checklists may be used in most routine permitting actions to determine, if needed, the amount of mitigation for indirect impacts.

Need for mitigation is indicated when the predicted risk to aquatic resources from an indirect impact categorically (e.g., “high” “medium,” “low.”) exceeds the predicted indirect (offsite) benefits from a proposed mitigation site. For example, a proposed impact may pose “high risk” for degradation and a proposed mitigation site may offer “moderate benefit” to offsite aquatic resources. With this example, the “base ratio” for compensation may be “0.5 to 1.0.” That is to say, 1.0 acre of indirect impact requires 0.5 acres of mitigation in the form of reestablishment or establishment. The relatively low base ratio is specified because indirect impacts rarely result in loss of aquatic resource area.

Once the base ratio is set additional adjustments to that ratio are made based on each of the steps described in a mitigation ratio setting checklist.

7.0 Assessing Direct and Indirect Impacts and Mitigation Needs for Large Scale Projects

A different assessment framework is used when examining the direct and indirect impacts of large scale projects. Large scale projects mean proposed development activity that poses ecological risk to a landscape area that is a magnitude larger than a project watershed area

The types of projects that typically fall into the large scale category are mines, energy development, water supply, flood control, and in some instances residential and industrial developments. A different assessment framework is used because the assessed environmental effects of direct and indirect impacts merge at the broader scale of a landscape. In other words, landscape function is directly affected by both types of impact. It is not ecologically meaningful to differentiate the types of impact.

A separate regulatory training note presents an assessment framework for large scale projects.

ATTACHMENT 2

Regulatory Training Note #3

REVIEW OF AQUATIC RESOURCE IMPACTS AND MITIGATION NEEDS FOR LARGE SCALE PROJECTS



This training note was prepared to accompany a training presentation for state and federal regulators involved in the permitting of dredge and fill activity. The presentation describes a watershed approach for regulating projects. Emphasis is placed on the role of assessment and monitoring to guide decisions. This particular training note will assist the review of large scale projects. The risk-based principles and review methods described in the note are applied using environmental information typically compiled for

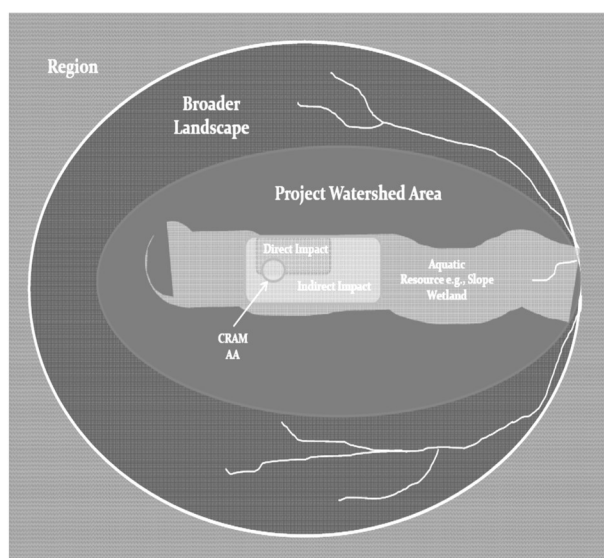
such projects. The review framework differs from a more comprehensive risk assessment. A risk assessment may include the design and completion of studies that generate new project data.

Also, this training note is intended to complement and help inform use of a Corps of Engineers mitigation ratio setting checklist. See Section 2.1.

1.0 Regulatory Basis

The Clean Water Act Section 404(b) (1) Guidelines specify that factual determinations be made about the extent of a project's impacts, including secondary and cumulative impacts. The subpart of the Guidelines that addresses compensatory mitigation does not differentiate between "direct" and "indirect" impacts in their specification for compensatory mitigation to offset losses of aquatic resource functions and condition.

This training note may be used to review circumstances when mitigation may be required to offset both direct and indirect impacts attributed to large scale projects. It also may be used to inform determinations of "significant degradation." Large scale projects mean proposed development activity that poses ecological risk to a landscape area that is a magnitude larger than a project watershed area. A project



watershed area means a watershed or part of a watershed that encompasses a project site. Its geographical boundaries are defined based on land cover composition, topographic elevations and ecoregion setting. A project watershed area is generally smaller than a 10-digit HUC watershed.

2.0 Overview of Assessment Framework

Large scale projects typically include new and expanding mines, energy development, water supply, flood control, and in some instances residential and industrial developments. The review framework for large scale projects integrates both the direct and indirect impacts of a project on aquatic resources. The reason is that the adverse environmental effects of direct and indirect impacts from large projects merge at the landscape scale of assessment. During assessment direct impacts are often aligned with the “footprint” of a project. The impact of that “footprint” can cause a break in the connectivity of aquatic resources in a landscape area. As a consequence of the break, landscape functions of aquatic resources may be substantially reduced or altered. In other words, landscape function is directly affected by both types of impact. For large scale projects it is not ecologically meaningful to differentiate the two types of impact when assessing their adverse ecological effects.

The concept of weight-of-evidence and a risk-based framework are used in the review of large scale projects. For purposes of this training note, weight-of-evidence means a logic-flow used to describe, “sieve” and logically align independent pieces of information that are used to make determinations of impact and mitigation needs. The review relies on assessment information typically collected during the environmental review process.

Weight-of-evidence is particularly suited to situations where quantitative impact models are absent or when they generate results of low quality (high uncertainty). Combining various lines of evidence reduces the chance of making erroneous conclusions based on a single line of evidence (*e.g.*, only relying on numerical models with limited accuracy). It also allows for a balanced consideration and merging of different types of information, thereby building greater understanding of potential ecological impacts.


The risk-based framework used in the review has three parts. The first part is used to review risk associated with project impacts. The second part is used to review the ecological benefits associated with proposed compensatory mitigation. The third part is used to compare the risk of impacts and the benefits of compensatory mitigation. Each part of the framework comes with a set of review factors and criteria (See next sections).

The three-part review is completed to answer three questions:

1. Which project alternative is least-environmentally damaging?
2. Will proposed compensatory mitigation likely offset unavoidable impacts to aquatic environment?
3. Will unmitigated impacts pose risk of significant degradation to the aquatic environment?

2.1 Using the Corps of Engineers Mitigation Ratio Setting Checklist

The described risk-based framework may be used as a “worksheet” to help a project reviewer complete a Corps of Engineers mitigation ratio setting checklist (if available).



SPECIAL PUBLIC NOTICE

U.S. ARMY CORPS OF ENGINEERS
SOUTH PACIFIC DIVISION

BUILDING STRONG.

February 20, 2012

STANDARD OPERATING PROCEDURE FOR DETERMINATION OF MITIGATION RATIOS

CORPS CONTACTS:

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INTRODUCTION: This informational public notice announces a recently established procedure for determining compensatory mitigation requirements as required for processing of Department of the Army (DA) permits under section 404 of the Clean Water Act, section 10 of the Rivers and Harbors Act, and section 103 of the Marine Protection, Research, and Sanctuaries Act.

This procedure applies to the Regulatory Program within South Pacific Division (SPD), including its four subordinate districts: Albuquerque District (SPA), Sacramento District (SPK), Los Angeles District (SPL), and San Francisco District (SPN). This procedure is applicable for all permit applications received after 20 April 2011 that require compensatory mitigation. Compensatory mitigation is the restoration (re-establishment or rehabilitation), establishment (i.e., creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable, adverse impacts that remain after all appropriate and practicable avoidance and minimization of aquatic resources has been achieved. The procedure was updated on January 23, 2012.

Historically, the SPD Regulatory Program has lacked a procedure or guidance for determining compensatory mitigation ratios as required for processing of Department of the Army (DA) permits under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act, and Section 103 of the Marine Protection, Research, and Sanctuaries Act. In addition, the 2008 mitigation rule (33 C.F.R. Part 332) does not provide a detailed procedure for determining compensatory mitigation ratios. However, it does provide some general guidelines and requires that the rationale for the required replacement ratio must be documented in the administrative record for the permit action. To address this long-standing need, a multi-district team was formed to develop a regional procedure for determining and documenting compensatory mitigation ratios, as well as accompanying guidance for Regulatory project managers. The purpose of this new, regional procedure is to reduce inconsistency between project managers, offices, and districts in determining compensatory mitigation requirements, to incorporate

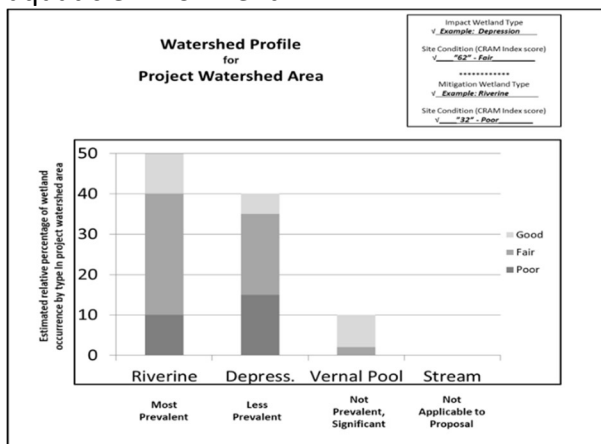
U.S. ARMY CORPS OF ENGINEERS – SOUTH PACIFIC DIVISION
<http://www.spd.usace.army.mil/cwpm/publicops/regulatory/index.html>

For example, some checklists call for a quantitative or qualitative comparison between the functional losses of aquatic resources caused by impact and the functional gains predicted for proposed compensatory mitigation. In most situations, quantitative functional information will not be available for a project. Therefore, a qualitative approach is most often used to account for functional loss and gain at the “site scale.” Functional loss and gain at the landscape or “watershed scale” requires use of a supplemental assessment tool. Watershed profiles, as presented in this assessment framework, help fill the gap.

2.2 Using a “Watershed Profile” in Large Project Review

A key component of the risk-based framework used in project review is watershed profiles. A

watershed profile means a qualitative (narrative) or quantitative description of the abundance, diversity and condition of aquatic resources in a project watershed area or broader defined landscape area. Those three attributes of a watershed reflect the functioning and health of aquatic environment.



Watershed profiles act as a reference point for analyzing the relative magnitude of aquatic impact attributed to a proposed project and the relative magnitude of benefit of compensatory mitigation proposed to offset that impact. Analysis is focused on making a determination of whether mitigation will offset project impacts in a way that sustains and enhances the watershed profile of project watershed area. With a positive determination it is presumed that hydrologic equivalence is attainable.

That is to say, most hydrology-based landscape functions (processes) are predicted to remain intact.

The following sections describe how such review is conducted.

3.0 Review of Impact Risk

A review of impact risks focuses on the types of project-caused stress that are likely to have an adverse effect on the environmental attributes of aquatic ecosystems and landscapes. Narrative criteria are used to evaluate the amount of adverse effect, and thereby inform a determination of risk to each attribute. Completed determinations are grouped and reported in a way that allows comparisons to be made on the relative magnitude of risk of proposed actions.

Table 1 shows how determinations of impact risks are grouped and formatted into a matrix (“score card”). The matrix has four components. The first component is the environmental attributes of an aquatic landscape that may be impacted by a project:

- (a) Its “watershed profile;”
- (b) Aquatic life that is dependent on the watershed profile; and
- (c) Occurrence of a special status area.

A special status area is an area with recognized capacity for provisioning specific ecosystem services or that supports regionally significant wildlife resources (e.g., wildlife management areas and other natural conservation areas). The size of a special status area may vary by the type of ecosystem service and wildlife resource under consideration.

The second component is the types of environmental stressors typically associated with large scale projects. Stressor type includes consideration of the duration and intensity of a stressor’s effect on the aquatic landscape.

The third component is narrative criteria used to evaluate the magnitude of risk of a stressor on the environmental attributes of an aquatic landscape. The risk criteria are:

- “Low risk” if adverse effects will, more likely than not, be confined to a project watershed area;
- “Moderate risk” if adverse effects will, more likely than not, be confined to a broader watershed area; and
- “High risk” if adverse effects will, more likely than not, extend into a surrounding region.

The fourth component is the “scoring cells” within the matrix used to show results of the assessment. The scoring cells are organized in a hierarchical way. Lines of evidence are gathered together in an upward direction within each “column” of the matrix. Risk is then summarized for the three main landscape attributes: Landscape function, aquatic dependent life and special status area.

4.0 Review of Ecological Benefits from Proposed Mitigation

Many of the same factors used in the risk review of impacts are used in reviewing of the ecological benefits of proposed mitigation for a large project. The main difference is that mitigation is examined in terms of its potential to remove or control existing stressors in an area, and in a way that allows for sustainable ecosystem restoration. Restoration may include a preservation component.

Table 2 shows how determinations about mitigation benefits are grouped and formatted into a matrix (“score card”). The matrix has four components. The first component is the environmental attributes of an aquatic ecosystem and landscape that may be restored and protected by a mitigation project:

- (a) Its “watershed profile, “
- (b) Aquatic life that is dependent on the watershed profile;
- (c) A special status area, and
- (d) The ecological suitability of the mitigation area for attaining mitigation objectives.

The second component is the types of environmental benefits typically associated with large scale mitigation projects. Benefits include consideration of amount, timing and duration of functional/condition lift to the aquatic landscape.

The third component is narrative criteria used to evaluate the magnitude of benefits to the environmental attributes of an aquatic landscape. The criteria are:

- “Low benefit” means effects will, more likely than not, be confined to a mitigation project watershed area;
- “Moderate benefit” means effects will, more likely than not, be confined to a broader watershed area; and
- “High benefit” means effects will, more likely than not, extend into a surrounding region.

The fourth component is the “scoring cells” within the matrix used to show results of the review. The scoring cells are organized in a hierarchical way. Lines of evidence are gathered together in an upward direction within each “column” of the matrix. Benefits are then summarized for the four landscape attributes: Landscape function, aquatic life, special status area and the ecological suitability of a mitigation area.

The ecological suitability of a mitigation area takes into consideration the amount of uncertainty of attaining mitigation objectives. Key factors considered are:

- (a) The ecological suitability of the mitigation project site e.g., substrate, hydrology,
- (b) The availability of adequate water (quantity and quality) into the future,
- (c) Trends in land use development that affect ecosystem connectivity, and
- (d) Trends in the spread/control of invasive species.

5.0 Reporting the Environmental Risks of Large Scale Projects

Use of the overall risk review framework (matrices) will vary slightly depending on the management question that is asked. The following general directions show some of the differences.

1. Which project alternative is least-environmentally damaging?

Complete Table 1 for each project alternative. For each alternative, examine the proportions of “risk scores” along each row of the matrix. Select the alternative having fewest number of moderate and high risk scores.

2. Will proposed compensatory mitigation likely offset unavoidable impacts to aquatic environment?

Complete Table 2 for assessing the benefits to aquatic resources provided by a proposed compensatory mitigation plan. Examine the proportions of “risk scores” assigned for a selected project alternative (Table 1) alongside the proportions of “benefit scores” attributed to the mitigation plan (Table 2). If the risk scores trend toward being a magnitude higher than benefit scores, then the project will likely cause widespread degradation of aquatic resources. Magnitude is reflected in the color codes used in scoring.

A key tenet in the review of mitigation benefits is that the certainty of attaining benefits from a mitigation project area is correlated with both the size and location of that mitigation area. For example, it is reasonable to presume that successful mitigation can be conducted at one or more mitigation sites to offset impacts that are confined to a project watershed area. However, there is much greater uncertainty that impacts affecting larger watersheds and landscape area can be offset in a single mitigation (watershed) area. It is a major challenge to locate and conduct a type of mitigation in a single area that will substantially benefit a broad landscape area. Dam removal is probably a good example of the type of mitigation that would generate landscape scale benefits.

3. Will unmitigated impacts pose risk of significant degradation to the aquatic environment?

Examine the “risk scores” (Table 1) and “mitigation benefits scores” (Table 2) assigned for the landscape attributes (i.e., top row of matrices). If the risk scores trend toward being a magnitude higher than benefit scores, then the project will likely cause widespread degradation of aquatic resources. If the risk applies to a special status area, then a reasoned decision may be made that the project will cause significant degradation. As described in Section 3.0, a special status area is an area with well-known capacity for provisioning specific ecosystem services or that supports regionally significant wildlife resources.

6.0 Getting Started

The following steps may be taken to start the process of conducting a risk review of a large scale project. Each step is completed using existing information gleaned from the project file.


1. Prepare a narrative description of the watershed profile for the project watershed area.
2. Identify aquatic resource types in the project watershed area that are at risk of conversion and degradation by the project. Use the information to revise or expand Table 1 and Table 2 (Row 3).
3. Identify and group major biological taxa that are at risk by the project, including special status species. Correlate the taxa groups to mappable types of habitat. Note that aquatic habitat types may differ from types of aquatic resource.
4. Decide whether a project watershed area is part of an encompassing “special area.”
5. Begin completion of “Row 2” in Table 1. Decide whether the project will substantially reduce, through direct conversion to developed land, the occurrence of a particular type of aquatic resource in a geographical area of greater size than a project watershed area. Answer by examining whether the impacted type of aquatic resource in the project watershed area is relatively confined to that area, and whether its loss would disproportionately be a loss for a much broader landscape area. For example, headwater occurrence in a broad landscape area may be concentrated within a demarcated project watershed area. In that situation loss poses a risk to the project watershed area and the broader landscape area. In other words, the headwaters of the project watershed area are a major component of the watershed profile of the larger landscape area (i.e., “moderate risk - )
6. Decide whether or not the project will substantially reduce the occurrence of a particular type of aquatic resource beyond the project watershed area as caused by hydromodification (“Row 4”) and water quality degradation (“Row 5”).
7. Based on weight of evidence, determine the magnitude of project impact on the overall abundance of a particular type of aquatic resource that is represented in the watershed profile (Enter in Row 2, Table 1).
8. Continue filling-out Table 1, including review of risk to aquatic resource diversity, condition, aquatic life and special status area. After completing Table 1, complete Table 2 characterizing the magnitude of benefits attributed to a mitigation proposal.




TABLE 1. Reviewing Risk of Project Impacts

Assessment Question (See Section 5.0): _____

	Affected Attributes of Ecosystems and Landscapes								
Row 1 RISK FACTORS→	Affect Landscape Function and Sensitivity to Future Impacts ("Alter Watershed Profile") – Complete assessment for each type of aquatic resource within profile affected by project. 0						Affect Aquatic Life, including its Sensitivity to Future Impacts 0		Affect Special Status Natural Area or Ecosystem Service Area 0
Row 2 Project Impacts To the Aquatic Environment ↓	Aquatic Resource "A" – 0 e.g. Headwater streams including springs			Aquatic Resource "B" -- 0 e.g. Slope wetlands			Biotic Communities: Habitat patches 0	Special Status Species: Habitat patches 0	Proportion of area affected 0
	Abundance 0	Diversity/ Distribution 0	Condition 0	Abundance 0	Diversity/ Distribution 0	Condition 0			
Row 3 Conversion of aquatic resource to developed land use	0	0	0	0	0	0	0	0	0
Row 4 Hydromodification of aquatic resources	0	0	0	0	0	0	0	0	0
Row 5 Water quality degradation of aquatic resources	0	0	0	0	0	0	0	0	0
Review and Scoring: Scoring is conducted using the criterion described in Section 3.0. Low Risk🟢 Moderate Risk🟡 High Risk🔴									

TABLE 2. Reviewing Ecological Benefits of Proposed Compensatory Mitigation

Assessment Question (See Section 5.0): _____

	Affected Attributes of Ecosystems and Landscapes									
Row 1 ECOLOGICAL BENEFIT FACTORS→	Sustain and Improve Landscape Function and Reduce Vulnerability to Future Impacts ("Improve" Watershed Profile") -- Complete assessment for each type of aquatic resource within profile affected by project 0						Improve Aquatic Life Use and Vulnerability to Future Impacts 0		Sustain Special Status Area or Ecosystem Service Area 0	Ecological Suitability of Mitigation Area 0
Row 2 Project benefits To the aquatic environment ↓	Aquatic Resource "A" – 0 e.g. Headwater streams including springs			Aquatic Resource "B" 0 e.g. Slope wetlands			Biotic Communities: Habitat Patches 0	Special Status Species: Habitat Patches 0	Proportion of area affected 0	Restoration Potential and Future Threat 0
	Abundance 0	Diversity/ Distribution 0	Condition 0	Abundance 0	Diversity/ Distribution 0	Condition 0				
Row 3 Conversion of developed land cover to natural land cover	0	0	0	0	0	0	0	0	0	0
Row 4 Increase natural hydrological connectivity in aquatic network	0	0	0	0	0	0	0	0	0	0
Row 4 Improve water quality in aquatic network	0	0	0	0	0	0	0	0	0	0
Review and Scoring: Scoring is conducted using the criterion described in Section 4.0. High Benefit  Moderate Benefit  Low Benefit 										

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