

10-25-90  
@ Simpson

## Coastal Hab. Worksession on Restoration

Intro Dave, Brian

(Prog. Rept + Tech'l Workshop  
report avail. to see, only)

Mike Stoholl, UNF

Fucus results - (Herring Bay part): (+ # receptacles/plant, <sup>top</sup> <sub>(2x diff)</sub>)  
Fertile plants - more in control than oiled areas  
Bare areas (coverage) - more in oiled areas (2x diff)  
Innoculations - ~~more~~ <sup>more</sup> plants (10 vs 4 / 50 cm<sup>2</sup>)  
in controls ~~vs~~ oiled treated ~~vs~~ controls (Fertile plants  
in bags suspended above areas)  
Some spp differences, not yet quantified.

Stoholl / Highsmith - can predict slower recovery rates in treated areas due  
to % cover (protection for young plants from desiccation, etc.)  
not converging (in treated vs control areas).

So - early to say if active intervention needed - want to  
look at it next spring.

Ray H - if people need to do winter work, barge will be there.  
But - need to coord it w/ him, since only 14 days  
funding avail. now (i.e., people will have to pay...)

Settlement: fertile May/June, but releasing spores all summer long.

If Restn is necessary - restn could involve attaching bags of fertile  
plants @ intervals to release spores locally. (Good if egg settlement is  
limiting - note that plants are recruiting now. Q is whether bags, etc.  
would enhance rate.)

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# Coastal Hab, cont

Spies, Highsmith, Peterson -

All strongly recommended recovery monitoring as essential.

Andy Hooten -

(Consider going through DEC/other agency monitors notes to recreate specific treatments that were applied in specific areas.)

## Intertidal Fauna

Looked @ pop'n dynamics of inverts, and did reciprocal rock experiments w/ fresh + E-V. crude, + did tilt experiments (diff't substrate types).

Overall, on 30 sites (15, <sup>w/ respective</sup> ~~replicates~~ controls) also looking @ barnacle recruitment in stained areas by cleaning patches, + looking @ exposures to grazers (w/ + w/o lids)

Peterson - important, yes, but 1st order Q is whether treatments as a whole ~~are~~ impeded recovery, w/o r/t which treatment.

Upper intertidal community significantly impacted by the spill/cleanups (Patchy distrib'n of recruitment in Herring Bay, too)

↳ (Ray - not just competition as factor, but recruitment may be important, too. Maybe more so in N than in S.)

- Differences muddier as go lower in intertidal.
- Recruitment of limpets higher in oiled areas @ lower intertidal (none in upper intertidal - oiled or control) (But lit. suggests recruitment naturally low intertidal, + move higher as grow.) Will be monitored to see if this pool of low-recruits can re-occupy the cleaned areas in upper intertidal.

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Coastal Hab., cont.

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Q - Any info on mussel recruitment? And would placing artificial substrates off study sites help address gen'l recruitment potential / larval transport?

(Others came in - I mixed answers)

Break.

Tom Dean (for Steve Jewett) Subtidal  
little data yet analyzed, but:

- Last year saw "dead zone" in oiled bays.
- This year, didn't see dead epifauna, but did see dead infauna on surface in both oiled & non.
- Nephthys in oiled areas - sublethal effects
- More - See Handout

- Some ~~sublethal~~ increased predation and sublethal effects (parasitic impacts) on starfish
- all protected bays' sediments had oil (oiled areas) in sed's (sheen test) (not in unprotected bays.)
- Infaunal community indices not yet avail. for oiled vs un-oiled sediments. (Didn't receive samples yet, so not even a visual idea.)

- Eelgrass - no indication of reduced density/biomass.
- Have Handout w/ proposals

Dave Cartillion - Air/Water 3 -

- 1990 data not yet avail - should be avail in ~2 wks

- Have Handout w/ proposals

subtidal algae:  
Nereocystis, etc  
no diff oiled vs non.



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Coastal Hab. cont

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Devl, cont.

'89 data, found contem'n down to at least 20m

Roy H

- Intertidal - all sites visited 2+ during season.

~~(Dropping and estimate)~~

- Re: intertidal fish - gill damage, + maybe density difference, + maybe year-class missing.  
(+ according to Roy Dowlin, river otter that feed on intertidal fish seem to be affected - may be connection.)  
[me - also, blood parasite differences, oil vs non]

John Kaurin

- 1989 samples just coming in. No results yet  
(sed/mussel hydrocarbons) - 20 sites in '89, 18 in '90.  
(PWS + Kenai). (Incl's samples from sites before oil hit; then @ 2 wks, 6 wks, + 22 wks)  
Photos @ each site for coverage/recruitment of barnacles/mussels.

Seem to be diff's in barnacle settlement. Not sure yet if oil-related (more settlement on E side of PWS than W).

Kim Sundberg

- used airborne spectrographic imagery to test for Fucoxanthin algal <sup>cover</sup>, + to compare this remote sensing info w/ on-ground transect info to see if technique could be used on more broad-scale basis.

In field test, found: ~~that~~ (sample image passed around) Pixels  $\leq 1m$ . Differences in oiled vs control

all app. combined.

→ (11-26% less algal cover on oiled beaches)  
(didn't try to separate dipt. algae - think could be done, though)  
Ground-truthing = 90% correlation) Would work for marshes, too

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Can even separate rocks w/ ferns from rocks w/ oil.  
Can input to GIS +, w/ corresponding topo data,  
can make 3-D models + do true % cover, etc.

- Lunch -

Going over 6 written ideas/proposals (3 NOAA ideas passed out)

- Elgymus - Broderick overview.

Peterson - known techniques, archeol. connection possible but in some not too long time frame would naturally recover. (Public involvement/PR plus here, too.)

Ray - how fast to naturally recover?

Mark - can be fast if no erosion problem. might not recover at all if active erosion.

Spies - consider combo w/ feas. study (plant some areas + leave others bare)?

Peterson - Add idea to involve public in ext'n - make sure list is comprehensive.

Marshes - See KB/LC's notes - I was debating!

- Peterson - look into greenhouse propagation from collected seed, vs transplanting from other marshes. [Rich - already collected seed to ~~study~~ for this possibility] →

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## Coastal Hab., cont

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Strong feeling that much of the marsh work should be re-proposed as feasibility studies. "Looks like a solution looking for a problem."

Peterson - what about "touching" these areas to get oil out + speed recovery!

-Break-

NOAA Proposals:

Kaunen / Babcock - Feasibility Study

Peterson - unclear on connection between HC's in mussel tissue and recruitment vis-a-vis settlement on rocks.

Stekoff - Ideas

Fucus - @ remote sensing described by Kim S.

useful - Fucus perennial, so should be useful. @ growth rates + @ egg dispersal studies to i.d. expectations for nat'l recovery.

@ ext'n techs - bags of fertile Fucus, plates w/ varying surface textures, etc.

- I left to call EPA Cornwallis -

on Air/Water # 3 (Short + Bounds proposal)  
Mark Broderson asked if it can be modified to cover  
oel monitoring need. to determine if further cleanup is necessary.

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- Air/Water #2 (Rice + O'Clair's proposal)

- Discussion on ~~the~~ suitability of monitoring under restoration, w/ Martha stating that she's comfortable w/ monitoring to the extent that it focuses on estimating time to netl recovery; But that monitoring to recovery probably would be a post-settlement exercise.

Dave Gibbons - Summary of meeting consensus.  
See L.C. / K.B.'s notes

5: PM End

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Coastal Habitat

(Oct. 25, 1990)

Intro: Brian  
Daneq. → explained new time frame  
for rest'n projects to be proposed for  
1991; Wash Policy sp. → "dynamic plan" start @ 1991  
(tech. feasibility studies; actual rest'n projects:  
direct rest'n, replacmt, acquisit)

criteria

- bkgd → other work sessions will meet; all projects  
proposed today may not go forward, dep. on  
total \$ + \$ is coming from agencies

→ 1990 Focus study - funding got messed up - just  
got off the ground

UAF

Focus (Herring Bay) - combin. monitoring + "rest'n"

control areas → less coverage

more fertile plant in control area (all tidal  
hts)

think

# receptacles per plant (more in control)

egg release → no diff

settlement - mesh bags

few Focus plant survived innocul.

"oiled" areas  
cleared  
already

more plants in control  
10/50<sup>2</sup> vs. 4/50<sup>2</sup>

Plants 0-1% control }  
0-5% oil }

no set aside sites

no water samples

90 cover → 2<sup>x</sup> as much 60% control } 1-2-3-4 m  
30% oil. } verticle drop

⇒ recruiting to oiled (treated) areas  
do bags further enhance? Bags were  
left out there as feas. study (2)

impact of grazers ⇒ ~~over est~~ estimates  
would make effects conservative

seeded plates ⇒ no plants grew

transpl. growing fucus - small diff's. on control

less fuc. in upper pt. of intertidal ⇒ doing a little better  
those there were younger + less mature

would expect effects are patchy ⇒ localized areas  
if rest'n is needed - should be localized (is it worth it)

"early to tell"

% cover not converging (it was expected)

if grazers were ↓, fucus should take off.

fucus needs surface variability to start

Bristol Bay ice scoured areas ⇒ fuc. gets wiped out every  
year - small plants come in  
cracks (+ bare rock)

when does settlement start?

fertile all summer (Bristol Bay ⇒ fertile in May/June)

Henne Bay oiled sites on west side  
control " on east side

Types of things that can be done:

① [to help dispersal] bags of fertile fucus pls. → attach to substrate  
put at 3 intervals

② nets ~~transfer~~ to trap drift fucus.

③ grow pl. in culture - attach to bare spots

focus - bare spots <sup>out there</sup> naturally

70 covers - not recovering yet [but plants are slow growing  
v: 3yrs. to <sup>become</sup> fertile]

→ need set asides to det. whether oil was really a prob.

2 set asides sites (moderately oiled at best)  
probably lightly oiled

Bridg. <sup>RPMG must</sup> be able to argue that nat. recov. will be inadequate:

- ① lit. search
- ② accountability → monitoring of projects to det. if benefits

reasonable actions taken to det. if damaged also incl. nat rec. monit.  
risk that projects proposed now might now be reimbursable [lit review is imp.]

dec. has been made → agencies will do something next year → risking \$.

agreement. → nat recovery monitoring is essential part

Frustrat. @ inability to test what clean-up effects were <sup>v: hot H<sub>2</sub>O</sup>  
what did clean-up do to recovery rate  
(rocks are porous - <sup>clean</sup> rock cracked open had oil & caused shear)  
might need to actually do exp's. (too hard to ~~test~~ det at this stage)

imp pt → diff btwn oil & frtd. areas

Bay of Isles → close to setaside

drag Haron → w/in 1 mile to setaside

no harm in doing res't. of focus →  
harm to do res't. of limpets  
rest'n shld be ecosys. approach

? no known areas outside spill area <sup>needing</sup> rest'n ?

Andy H. →

historical record (ADEC) exist → may be  
able to choose study sites  
+ trace record

have done that for all study sites in Henry B  
(some up from reciprocal rock st.)

bare open  
15 plots  
impact / ref  
sites

Transects

in same plots  
as focus

presence/absence data

→ enumerat. of limpets <sup>Littorin.</sup> ped. seastar

→ fresh / yr. old crude on rocks →  
Rock Expts. placed in field

files to control for —

→ barnacle recruitment. u: upper intertidal.

areas of heavy tar vs. cleaned area

→ limpet grazers (cages, fences)  
14 grazers

more limpets at oiled than oil.  
upper intertidal area def. impacted; diff in densities  
in invertebrates def. impacted by oil  
(barnacle still present → diff b/w tar + clean.)  
patchy dist'n of invertebrates.

(~~some~~ certain areas had heavy  
recruitment + others did not)

→ recruitment may drive AIC communities more

will there be large diff btwn oil / non-oil sites →  
even smaller scale shows

grazers are having an impact ~

cleaning (in case of tar cards) was benef. For barnacles

limpets - cleaning "unk" (← 4mm in size) <sup>~1 yr. old or maybe older</sup> season's recruits - showed  
did not find unkn. limpets at  
upper - but did find them  
at lower

(higher #s of recruit.)

180 perm. plots to look at pop'n dynamics at Henning Bay

fuco } good quant evid. for damage of oil (cleared) area  
limpets } good bkgd data to do ongoing study of recovery

(shorebirds)  
were  
bird  
surveys  
done in  
study sites

fences up algae ⇒ lost limpets most?

mussel recruit. ? no good info.

Canal transport ⇒ (wanted to do plankton tows off  
study sites ⇒ good idea.)

NOAA lab took pictures?

Elmington ⇒ mussel bed impacted by

cleaning / oiling ⇒ large pt. was removed

was HC quantitated on any study sites? ⇒

collected HC samples on 14 of 30

study sites (limpets ⇒ in Ark Bay for  
sediments analysis)

Review of NRDA → Preliminary

Tom Dean  
Shallow subtidal →

last year saw lots of dead things (sgund, starfish, oct.)  
some recovery in 1990 (i.e. selledfyord)  
but did see anoxic zone } some dead infaunal spp (yearly phen. occurring every fall)  
but no starfish etc.  
sublethal effects (infaunal polychaetes →) →  
lesions or tumors

protected bays } Laminaria } effects  
eel grass }

oil in sed's up to 20 m. sheens coming off sed's.  
found oil in all sed's from protected bays  
→ more exposed sites - no oil seen in sed's

↓ flowering eelgrass  
↑ parasit. of starfish dermatarias  
30% had paras. barnacles → castrated / sex. inad.

most effects will be infaunal

not so much obvious damage here

infaunal data incomp. (samples have not been sieved)  
→ no obvious (red. in density or biomass) effect in eelgrass

ELSA - polychaetes swimming thru sheening oil →  
small crustaceans → were not analysed yet (attempted to sample)

Dave Conditon  
NOAA study →

① Caged mussel deployment project →

25 sites (in part PWS)

1989 - HC contam. at several sites PWS

1990 - no data yet

Focus → 70% cover same as Herring B. Focus settled places (2m) better recruit. & growth on control / oil egg release. Focus no diff. 60% of viable eggs are fertilized not 99% in Jurek

AW (2) HC in sed.

27 sample sites

7 sites - 20 m.

1999 data  
 1999 Prel. data - 9 PWS sites - detect contam. 1 site - 100m depth

in a low energy?

meijunae samples taken → currently being analyzed.  
 infaunal samples collected in 1990 at all sites - not yet analyzed

could movement of oil be detected?

AW 3 (3) →

conclat. btwn what seen on beaches / water column → will need to bring together several studies are there really any control sites?

Rail Highs.

PWS, Kenai, Lower Cook In., Kodiak

reselected some sites (prob @ control sites) visited each site 2x during season - sampled, photo'd.

sorted '89 matched prs.

sorting '90 sheltered rocky PWS → data hopefully will be available

intertidal fish → appears to be gill damage (sublethal) anemism

density diff (oil vs control)

year class poorly rep.

→ maybe prob @ inner estuaries (that feed on fish)

in E. fine sed → open sandy beaches - little clam. showed up in samples

if evid of impacts on clams → maybe rest'n. (can spawn in hatcheries → tech est.)

still lots of oil  
in ~~Kenai~~ Kenai sites →  
may be underestimated  
by crews. (in sediments, not on surface)

John Carimena  
NOAA HC in sed's, mussels →

results just coming in from 1989 samples  
20 sites sampled in '89; 18 in '90  
4 sites Kenai, 16 sites PWS.

most sites  
were protected

triplic. HC samples, mussel samples → 30m transects  
- pre spill levels were ~~pretty~~ low

Post spill analyses - 2, 6, 22 wks after spill  
photos <sup>taken</sup> in doc. recruitment of barnacles

→ some diff in barnacle ~~stretch~~ for various sites -  
can't be det. of oil relat. or due  
to diff in sites (e.g. Esch Bay, Old Bay)

Rocky Bay → good historical data exists  
showing HC contam. [anxious to see data]

Elmgt. Is. } no data yet,  
Deep Bay } but heavily oiled

Kim Sundberg →

remote sensing tech. } 3 pr. sites (oil/control)  
compact airborne imager } ? → detect fucus / algae  
? → how data corresponds  
from transect info  
? → is tech valuable

1 oiled site - Disc Is.  
2 oiled sites - Henry Bay

lab study → collect & do spectral scan } strong correl. >90%  
btwn algae images

then used instrument to look at Fucus, algae

got coverage on all 6 of beaches

→ less algal cover on oil vs control 11-26% diff.

bands (new vs old algae) separated out by instrument

ground truthing was done

could separate out bare rocks, oiled rocks, & algae lev.

→ how cost est to expand studies w: ~~set~~ topography



1978 - publicat.  
over Tony  
Cantlon  
Zonabon.

Beach Widening → Honey's ltr

⊙ review of damage of sites  
→ more abundant (in 1<sup>st</sup> yr.) on clean-up sites  
Supratidal (J. Schumme) - not species specific → analysis  
ongoing  
Bay of Isles site incl.

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IPM - Restoration Projects:

Stoney Wright proposals →

\* fears. → compare nat. recov. @ planted  
- is planting just accelerat. nat. recov. by ~1 yr. or  
~~will~~ <sup>will</sup> it be done in areas that *Elymus*  
will not come back.

public involunt / public rel'n. → hi potential for.  
- no formal sci to support that these areas were  
<sup>supratid. *Elymus*</sup>  
damaged ∴ shld be photos/docum.

\* needs to document / experimentation

\* need to have a complete list of sites where rest'n can be done

→ do some 1<sup>st</sup> year + monitor others to det nat recov.  
→ sort out ones that would be handled under permit process

Marsh - CHEA sites (ASPG?)

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what % of all marshes have been damaged  
what is def of Marsh → i.e. Bay of Isles  
10-75 wide area of <sup>former</sup> veg. - grades down to mudflat

area remains heavily oiled [ ~~not~~ not much lit. on what levels of oil will prohibit marsh veg. coming back ]

should \$ be used to buy wetlands

→ does proposal incl. damage asmt, survey + rest'n.? shld damage asmt/survey work be done 1<sup>st</sup>. does Asmt. info. already exist at DEC?

- inadeq. attention to marshes in NRDA

→ proposal shld be more supported by better sci. asmt of damage  
- EPA started @ visual damage but more systematic work needs to be done  
nutrients, product., etc.

needs more rigorous designs (ORD working on ~~criteria~~ criteria parameters to det. damage)  
→ look for ~~areas~~ <sup>areas</sup> where no work should be done  
↳ do not want to lose planting season

→ need specific <sup>env. value</sup> attributes of each marsh area (i.e. bird use, etc) - compare control sites  
need standardized info on

impacts on resource + value of that resource  
fertiliz. vs replanting vs both  
↳ subseq. monitoring can be considered 'feas. study'  
1<sup>st</sup> step needs to be taken - i.e. erosion

discussions on Marsh rest'n in April → pot. damage outweighed improvements.  
→ something re: marshes shld be done  
→ could be considered a feasibility study

→ field det. what impacts will occur to area where plants will be taken  
(have id' some "donor" sites)

more detailed write-up needed

? ① greenhouse propag. (seeds already collected, will be used if viable)

→ areas will have oil left: - expect dieback so do it on small basis  
- <sup>creating an</sup> attractive nuisance <sup>(drawing</sup> wildlife <sup>into</sup> "oiled areas")

complexity of design - no: of testing seeding tech -  
not enough space thru time; <sup>sites</sup> not equally oiled → design got complex

? - will natural function <sup>(value)</sup> recover if the plants are restored  
(natural dieback of up to 2 yr; but recuperates after 2 yr)

? what about burning

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NOAA ⇒ Nat. Rec. monitoring (seeds + mussels)

Prob ⇒ select sites which have been damaged  
monitor recruitment, growth + survival

data from env. is from seeds, but looking at recruitment on rocks <sup>(is this a mgmt)</sup> (can est. HC by grazers on rocks)  
- mussels are integrating/accum. what's in water col.

[oil treated beaches vs ref. beach]

have they been exposed in the col. + does that affect their settling

is there rel'n btwn oil in sed + ability of mussels to recruit nearby (authors say there is a relation →)

HC in sedts (i. mussels in nearby areas)

would claim be better link (since it lives in ~~the~~ area of sampling)

→ "When have we reached recovery?"

can reach recovery in terms of tissue (other sublethal effects)

help to id. an crit for recovery.

risk of exposure (damage <sup>claim</sup> based on use value too  
i.e. contaminant levels in shellfish)

→ how is obj. 2 diff from what is already being done in coastal hab. project (Ray's)

need to monitor <sup>to det</sup> when recovery has occurred

will mesh together @ Coastal Hab. studies:

ideas for test

Focus

→ 1<sup>st</sup> det. what needs to be destroyed (remote sensing)

(rocky intertidal → monocult. of fucus)

→ what are growth rates of indiv. plants (i.e. 2-3 yrs for *Brutol*)

→ egg dispersal studies (al vs n.o. areas)

→ recia techniques [i.e. bags, plates of fucus at diff sites at diff times]

Foster → 3 factors affecting growth  
surface slope, aspect

if fucus gone → inverts would be gone too →  
could have impacted <sup>i.e.</sup> on shorebirds at upper intertidal

is focus on areas where where is.

- ~~clear~~ Cost is a factor (e: PWS)

- geog- range of oil + resist<sup>n</sup>,

- when is clear clear

- when oil coming out of deep

→ who is my ~~area~~

- is oiling leaching out of shore.

### Subsistence

- need answers to response questions for this season?

if difficulty in 2 yrs @ some beaches -

DEC will go in to clean them up.

must be env. benefit.

→ justify

- put mussels out on <sup>signed-off</sup> beaches that are of question  
of come back @ HC

coordinate with DEC for sites →

but could take 1 yr to get data back

from bioassay tests

use sheen instead (Prob @ accessing sites where sheen)

Mark → caged mussels study be redirected to

dirty beaches

but need contrast in other (multiple) sites

seasonal removal of oil?

and not the same  
llllllllll  
llllllllll

20 PWS } \$150,000  
8 Kenai } to ~~monitor~~  
16 Kodiak } use ~~to~~ remote sens.

→ must assess inter-annual variability →  
∴ continue studies

need to look at recovery rates of Focus

need to prioritize in terms of limited \$ -  
Should we spend \$ proving technique, or  
trying to find out if rest'n needs to be done.

⇒ nicely designed study - will add to body of info.

not enough data to det. that damage to mussel  
community?

NOAA - Caged, Uncom. Mussel  
Centr. of APW #3

2 wks till 1990 data -

most of what is coming up is in top cm.  
(approximately - 10-) yrs.  
~~either~~

winter → prod. disturbance  
accumulated of  
beet

addtl. info from mussels will address prob of recovery.

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Sediments - A+W #2 - NOAA - Natural Rec. - Subtidal Marine Sed's.

continue work 6 ref. sites  
9 cont. sites

to date only 1989 data

just because oil is found  $\rightarrow$  is there an  $\&$  injury  
(samples have not been ~~not~~ analysed)

linkage into food chain  $\rightarrow$

enzyme induction in fish

microfauna <sup>data</sup> analysis - how far along is it?

readily select oil in env  $\rightarrow$  is that sufficient bases for det. damage  
(+ potential <sup>animal</sup> for uptake)

\* Probably will be

$\rightarrow$  Study should be continued under NRSA, otherwise call it recovery monitoring

do we need justificat.? at time of proposing study, did not know amt. of oil (need to find out how much oil is there)

$\rightarrow$  possibly fold into sed trap study (Chick) Jon Lindstrom / Dave Saugle  
Safety concern @ diving program at DEC

NRSA

Tom Beam

## Subtidal

~~etc. etc.~~ → no need for direct rest'n  
sublethal effects only, rest'  
for that is unreas.  
→ no ~~feasible~~ technique

→ need more monitoring  
emphasizing infauna  
forage fish (sublethal data not  
in yet)  
possible effects on Dolly Vard.

Juvenile cod may be imp. to look at  
pollack for HC, parasites

→ rec. resch for future oil spills  
little "before spill" data  
if "restore", really managing → then need to  
know what you're managing

Mathan →

to present damages claim (more limited) - need to justify to judge  
what ~~cost~~ <sup>\$ spent</sup> ~~we did~~ to det. rest'n/assess damage  
should have oppty. to think about  
possibilities that would be considered  
under settlement.

in Coastal  
Habitat

have not been able to predict time to recovery

would claim include post-settmt. costs for monit. to  
det if ~~recovery~~ recovery has occurred  
take what's id. in methodology plan & put into plan  
once you know about \$ gotten



If you go to court ↓

need to have everything in methodology plan you expect to do.

→ hard to predict

→ monitoring of "recovery" → could be (i.e. subtidal)  
could be monitoring worsening conditions.

---

- Elymus → limited effort;  
chk permit effort
- Marsh → studies needs to be re-focused
  - ↑ info on what damages are
  - components of are feas., not rest'n.
  - studies will be mainly a feas. study, maybe some rest'n
  - disc. of what a marsh is in PWS.
- Old Sed's Mussels (J. Kuenen) Intertidal
  - will be combined @ coastal lab
- <sup>Cages</sup> Mussels Study (Deployment)
  - correlate @ heavily oiled beaches
- ~~Marsh~~ Sed - Do!
  - fold in sed trap work if possible
  - chk coastal lab so of no overlap

United States  
Department of  
Agriculture

Forest  
Service

Alaska Region

Reply to: Oil Spill Meetings

Date: October 18, 1990

Subject: Restoration Planning Meeting 10/25/90

To: Hal Kibby (EPA), Art Weiner (ADNR), Roy Nowlin (ADF&G) Ray  
Highsmith (UAF), Andy Hootin (UAF), John Karinen (NMFS), Josh  
Schimmel (UAF), Kim Sundberg (ADF&G), Steve Jewett (UAF), Pate  
Petersen (Peer Reviewer), Bob Spies (Chief Scientist), Jeep Rice  
(NMFS)

On October 25, 1990, a Coastal Habitat restoration work session is scheduled to be held starting at 8:30 am at the Simpson Building at 645 G. Street in Anchorage, Alaska. The purpose of the meeting is to review the results of the 1990 Fucus and intertidal invertebrate restoration feasibility studies, propose new restoration feasibility and restoration projects for 1991. The detailed agenda includes:

8:30 am	Introductions and opening discussion of purpose.....	Gibbons
8:45 am	Review of Fucus feasibility project.....	Kibby
9:00 am	Review of intertidal invertebrate feasibility project..	Hootin
9:30 am	Feasibility Studies/NRDA Damages.....	Gibbons
	(See Progress Report for guidelines)	
	Subtidal.....	Jewett
	Intertidal.....	Hootin Highsmith Kارينen Weiner Kibby
	Supratidal.....	Schimmel Kibby
12:00	Lunch	
1:00 pm	Restoration Projects/NRDA Damages.....	Gibbons
	(See Progress Report for preliminary list of factors)	
	Subtidal.....	Jewett
	Intertidal.....	Hootin et al
	Supratidal.....	Schimmel et al

To Stan Senner  
From C Meacham

271-246

TO: Stan Senner  
Restoration Program Manager  
OSIAR Division

9-28-90 DATE: September 28, 1990

TELEPHONE: 465-4210

FROM: David Ackley  
Marine Fisheries Biometrician  
Division of Commercial Fisheries

SUBJECT: Restoration  
Suggestions

Stan, below are some suggestions for potential restoration projects. Please contact me if you have any questions.

Distribution and abundance of littleneck clams (*Protothaca staminea*) and butter clams (*Saxidomus giganteus*) within Prince William Sound (PWS)

A current NRDA impact assessment project has collected data on clams at specific sites within Prince William Sound and is in the process of investigating the potential effects of the oil spill on clam growth. Although necessary for restoration considerations, little is currently known about the distribution and density of clams within PWS. This study would inventory clam populations across various habitat types within PWS, expand the impact assessment results to clam populations throughout PWS, and identify suitable habitats for clam population enhancements through restorative transplants. The Alaska Department of Fish and Game is the lead agency.

Transplant of clams from healthy habitats to areas affected by the oil spill or cleaning efforts.

Clam populations within PWS were damaged by the oil spill, by beach cleanup efforts, and by removals due to oil spill impact assessment studies. This study will transplant adult clams into the spill area from unaffected locations to restore populations to healthy levels throughout PWS. A transplant experiment was successfully conducted as part of an NRDA impact assessment study. The Alaska Department of Fish and Game is the lead agency.

SEEDING OF AREAS IN PWS AFFECTED BY THE OIL SPILL BY JUVENILE CLAMS GROWN UNDER CONTROLLED CONDITIONS.

Assuming a demonstrable impact on clam populations within the path of the oil spill, it is possible that affected populations may be restored through a seeding project. Under this study, clams would be taken from healthy areas and spawned under controlled laboratory conditions. Clams grown to the juvenile stage under controlled conditions would be introduced into substrate which had been heavily impacted by oil or by cleaning efforts. The advantages of spawning and rearing clams to a juvenile stage in a controlled environment are twofold. First, adult clams can be induced to spawn several times during a growing season, and second, survival of the larval stage is greatly enhanced under protected conditions. The Alaska Department of Fish and Game is the lead agency.

INVESTIGATION OF JUVENILE SPOT SHRIMP (Pandalus platyceros) ABUNDANCE AND HABITAT.

An NRDA impact assessment study has sampled adult spot shrimp habitat in order to determine the possible impacts of the PWS oil spill on the adult spot shrimp population. Although adult spot shrimp inhabit deep waters, it is believed that juvenile shrimp inhabit shallower waters likely to have been impacted by the spill. Little is known about the abundance, nursery areas or vertical distribution of juvenile (under 30 mm) spot shrimp. This study would sample potential nursery areas and depth strata for juvenile shrimp and provide information about areas which should be protected or enhanced to rehabilitate shrimp stocks which are already at low levels due in part to commercial exploitation. The Alaska Department of Fish and Game is the lead agency.

INVESTIGATION OF REEF HABITAT DISTRIBUTION WITHIN PWS AND ESTIMATION OF ASSOCIATED SPECIES.

Reef structures comprise an important habitat to many species, including rockfish, and provide a protective area for the juvenile stages of several species. Because this habitat is necessary to many species, it is important to determine whether habitat availability is a limiting factor in species diversity and abundance. This study would determine the extent of reef habitat within PWS, catalog the species present at a representative sample of reef sites, and determine areas of PWS deficient in reef structures. The Alaska Department of Fish and Game is the lead agency.

Colonization of artificial reefs by various species within PWS.

Reef structures comprise an important habitat to many species, including rockfish, and provide a protective area for the juvenile stages of several species. An increase in the availability of this habitat type may lead to a subsequent increase in associated species and further enhance commercial and sport fishing opportunities within PWS. This study would introduce artificial reef structures into selected areas within PWS and monitor colonization rate, species diversity and effectiveness of material use and placement. The Alaska Department of Fish and Game is the lead agency.

cc: Gordon Kruse  
Chuck Meacham  
John Hilsinger

NOAA'S NATURAL RECOVERY MONITORING PROGRAM  
FOLLOWING THE EXXON VALDEZ OIL SPILL

Title: Near Shore Seawater Quality Monitoring using Caged, Uncontaminated Mussels as Bioconcentration Organisms.

Principal Investigators: Jeffrey W. Short and Patricia Rounds

Introduction:

This study extends a part of the NRDA Air/Water #3 study, which involved the deployment of caged, uncontaminated mussels along the Exxon Valdez oil spill trajectory. These caged mussels act as extremely sensitive indicators of ambient water quality, because they accumulate biologically available hydrocarbons integrated over time.

Preliminary analysis of 1989 of petroleum hydrocarbons in tissues of caged mussels found hydrocarbon levels at several impacted sites higher than levels in caged mussels at Olsen Bay (reference site) or in the mussels prior to field exposure. Although analysis of 1990 caged mussels is not complete, continued elevated hydrocarbon levels relative to reference and unexposed mussels are expected. The determination that nearshore waters in Prince William Sound have returned to pre-spill hydrocarbon levels is necessary to establish that the potential of damage directly from polluted water is negligible, a determination important to restoration projects proposing transplanting key organisms damaged by initial oiling and cleanup to impacted areas.

Methods:

We propose in 1991 to expose caged "clean" mussels for one month at a minimum of one reference and 11 impacted sites in PWS (see appended site list) during the Spring, and again during the Fall. At each site mussel cages will be deployed at 1, 5, and 25m depths. Deployment and collection of mussels will be consistent with methods described in NDRA project Air Water 3 study plans for 1989 and 1990.

Other sites may be added in areas scheduled for berm relocation or washing. If analysis demonstrates continued elevated hydrocarbon levels, a single exposure will be proposed in 1992.

Budget:

Major costs in 1991 will be salaries, travel and vessel support. Mooring hardware purchased in 1989 and 1990 can be reused.

Line Item	Cost in Thousands of dollars
Labor	62
Travel	16
Vessel Charter	60
Supplies & Equipment	12
TOTAL	150

(These costs do not include the cost chemical analysis of approximately 80 mussel tissue samples for aliphatic and aromatic hydrocarbons, estimated at \$45,000).

NOAA'S NATURAL RECOVERY MONITORING PROGRAM  
FOLLOWING THE *EXXON VALDEZ* OIL SPILL

**TITLE:** *Exxon Valdez* crude oil in sediments and mussels; and rates of recovery of impacted biota on selected intertidal beaches in Prince William Sound (PWS), Alaska.

**PRINCIPAL INVESTIGATORS:** John Karinen and Malin Babcock

**BACKGROUND:** This study continues sampling mussels and sediments at intertidal sites that were sampled under the NRDA Coastal Habitat Contract to Auke Bay Laboratory. The first analyses of 1989 samples (sediments for hydrocarbons and photographic quadrats for abundance and diversity) are currently being conducted. We propose to monitor hydrocarbons levels at these sites, and to expand the design to measure rates of recovery and recolonization on selected intertidal areas.

In 1989, we resampled 10 historically (1977-1981) established intertidal hydrocarbon baseline sites in Prince William Sound in response to the *Exxon Valdez* oil spill. Additionally, 10 sites were established along the spill trajectory before oiling, and sampled after oiling to measure the increase of hydrocarbon levels in sediments and mussels resulting from the spill. Sampling was continued in 1990 (April, June, and August). We propose to continue monitoring activity (hydrocarbons in sediments and mussels) at these sites to provide a continuum of measurements following impact of *Exxon Valdez* oil.

Most of the sites established referred to in the first paragraph are low energy, fine-grained beaches at the head of embayments and were not subject to the rigors of intense cleaning activities; the biota is relatively healthy compared to beaches where vigorous cleaning action by the "Omnibarge" or other means occurred. In contrast, Houghton et al (in Press) found that in areas that were subjected to vigorous washing and other intrusive cleaning activities, intertidal surfaces were fairly devoid of mussels, barnacles and other biota that comprise the natural communities in this ecosystem.

### OBJECTIVES

1. For all established sites under the NRDA process - to estimate the hydrocarbon concentrations in mussels and sediments such that the estimate is within 10% of the actual concentration 95% of the time when total aromatic concentrations are greater than 200 ng/g dry wt.
2. To estimate recovery and recolonization rates of key ecosystem components [particularly, mussels (*Mytilus trossulus*) and barnacles (*Semibalanus balanoides* or *Balanus glandula*) which are dominant filter feeders in the intertidal area of much of Prince William Sound] on sheltered rocky and mixed soft substrates and 2 conditions of oiling/treatment. We propose to estimate rates of recruitment, growth and survival on these sites. The null hypothesis is that recolonization, recruitment, survival and growth in mussels and barnacles will be the same under all conditions.



## METHODS

*Historical Sites - Monitoring.* Sampling will be done in April and in August, 1991. Sediment transects (30 m) are located parallel to the water line at -0.75 m to +0.75 m (depending on specific site). We will collect triplicate sediment samples at each site by compositing 10 cores (dia 3.2 cm x depth 1.25 cm) taken at random along a 30 meter transect for each sample. Mussel transects are located usually just up (~ +1 m tide level) from the sediment transects. Triplicate mussel samples will be collected, approximately 30 2-5 cm. mussels at random.

*Recovery Processes.* To the extent possible, sites for this project will be chosen to minimize logistic problems and to build on previous data sets and studies. Sites can be drawn from the following: NOAA HAZMAT sites and sites used previously in other NRDA studies; e.g. FSHSHFSH 4; Coastal Habitat; ADF&G's Clam Study, etc. Triplicate sites will be stratified by morphology (sheltered rocky and mixed soft) and disturbance (unoiled and oiled/treated). One of the proposed sites will be the "Omnibarge" site for which Houghton et al (In Press) has pre- and post- treatment data for 1989. This will create a 3x2x2 matrix for a total of 12 sites.

Triplicate 30-m vertical transects on each site will be established and permanently marked. These transects will span the middle elevation of the intertidal area and will encompass the general area of mussels and barnacle. Triplicate quadrats (0.25-m<sup>2</sup>) will be randomly located along this line and permanently marked for non-destructive sampling. Barnacles and mussels and other major epibenthic fauna will be counted and measured in the quadrats. Algal cover (%) will be visually estimated. Triplicate, composite sediment samples for hydrocarbon analyses will be secured at each site. In the nearshore area off each site, 3 sets of artificial substrates will be placed at a depth of 1 m to document that mussel and barnacle larva are present in an adjacent area and presumably be available for settling/colonization.

All sampling procedures will follow protocol and guidelines which have been established under the NRDA process.

### BUDGET

Line Item	OBJ #1	OBJ #2	Combined
Labor	34.0	40.0	74.0
Travel	20.0	20.0	40.0
Contracts: Helicopter	20.0		20.0
Vessel Charter		84.0	84.0
Data generation, entry	7.0	5.0	12.0
Supplies & Equipment	<u>10.0</u>	<u>10.0</u>	<u>20.0</u>
<b>TOTAL</b>	<b>91.0</b>	<b>159.0</b>	<b>270.0</b>

Note: \$ for hydrocarbon analyses are not included above. Analyses for OBJ #1 is estimated to be 84K, and for OBJ #2 - 108K.

### LITERATURE CITED

Houghton, Jonathan P., William B. Driskell, Dennis C. Lees and Alan J. Mearns. In Press. Impacts of the *EXXON VALDEZ* spill and subsequent cleanup on intertidal biota - 1 year later. Submitted to Oil Spill Conference, 3. 1991.

22

NOAA'S NATURAL RECOVERY MONITORING PROGRAM  
FOLLOWING THE EXXON VALDEZ OIL SPILL

Project Title: Monitoring Natural Recovery of Subtidal Marine  
Sediment Resources in Prince William Sound.

Principal Investigators: Stanley D. Rice and Charles E. O'Clair

Introduction:

Subtidal marine sediments in Prince William Sound have become contaminated with petroleum hydrocarbons from the Exxon Valdez oil spill probably largely as a result of transport of hydrocarbons from the intertidal region mediated by physical and biological processes. The degree of contamination varies spatially and temporally. Preliminary gas chromatographic/mass spectrometric analyses of subtidal sediments collected by the Auke Bay Laboratory from 20 locations in Prince William Sound have shown detectable contamination of sediments from the intertidal region to a depth of 100 m in at least one heavily contaminated bay. At seven additional locations where sediments have been analysed contamination extended to a depth of 20 m. The Auke Bay Laboratory proposes to monitor hydrocarbon levels in sediments at contaminated and reference sites in order to provide information necessary to track the trajectory of recovery of sediment resources to pre-spill conditions.

Objectives:

- A. Determine occurrence, persistence, and chemical composition of petroleum hydrocarbons in subtidal marine sediments during period of recovery.
- B. Provide marine sediment data to assist agencies in modeling the time course of recovery to pre-spill conditions.
- C. Examine the relationship between the retention of hydrocarbons in sediments and the effect on benthic meiofauna during the period of recovery.

Methods:

Sediments will be sampled at 15 sites in Prince William Sound (6 reference sites and 9 contaminated sites). Sampling will be conducted during two periods (May and September). Sediment collections will be made at depths of 0 (MLLW) and at 3, 6, 20, 40 and 100 m below MLLW. Samples will be collected at low tide (0 m) or by divers (3, 6 and 20 m). At these shallow depths three samples each a composite of 8 subsamples will be collected randomly along a 30 m transect laid parallel to the shoreline or along the appropriate isobath. Samples taken at depths below 20 m will be collected with a Smith-McIntyre grab. Three cores will be taken at each depth. Four subsamples will be removed at

randomly selected points within each core. The subsamples will be combined to form one sample per core. All samples will be taken from the surface (top 0-2 cm) of the sediment column. Sampling procedures will follow the standard operating procedures developed by the Auke Bay Laboratory for damage assessment of the Exxon Valdez oil spill.

Budget:

**Salaries Travel Vessel Contracts Supplies Equipment Total**  
(Cost is in thousands of dollars)

71	12	100	35	21	16	\$255
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Analytical cost will be \$148.5.

1990 FERR. Study.

File

(Beach Program =  
FS # 3)

September 10, 1990

John Bauer  
Department of Environmental Conservation  
2550 Denali, Suite 705  
Anchorage, AK 99503

Dear Mr. Bauer:

On August 30, 1990, I examined six beach areas where possible damage to Beach Wildrye (Elymus arenarius E. mollis) communities may have occurred. The beach segments examined were:

Danger Island	DA002
Latouche	LA15C
Bainbridge	BA004
Knight Island	KN408
Ingot Island	INO22
Eleanor/Block	EL011

Of these beaches, only Latouche 15C, Knight Island KN408 and the fuel storage area between Elenor and Block Islands EL011 show any indication of damage to the Beach Wildrye communities. It is possible that this damage could result in accelerated erosion of the beaches, or the upland communities adjacent to the Beach Wildrye could be significantly impacted by beach encroachment. The most significant damage was noted on Knight Island 408. This damage can be directly associated with clean-up activity. Gravel removal and/or cleaning has resulted in damage to the Beach Wildrye communities. Also, although not a severe environmental problem, the haphazard (unnatural) placement of drift logs has caused the beach to become unsightly. This latter concern, although noted, is beyond the scope of my investigation and can be worked around if Beach Wildrye restoration is attempted.

REHABILITATION PLAN FOR KN408  
BEACH WILKYE COMMUNITY

I recommend that this Beach Wildrye community be repaired using a combination of transplanting and fertilization. The transplanting effort would only require a single band of Beach Wildrye placed approximately ten feet from the present log piles running parallel to the water's edge. This would require approximately 1,000 Beach Wildrye sprigs. A heavy application of 20-20-10 fertilizer (800 pounds per acre) would encourage the undamaged and transplanted Beach Wildrye to recolonize its former niche. I estimate that the restoration on this beach will take six man days.

REHABILITATION PLAN FOR LATOUCHE 15C  
BEACH WILDRYE COMMUNITY

On August 30, 1990, this beach was still undergoing clean-up. The damage being done was similar to that observed on KN408, however this beach has not been as significantly impacted as KN408. If the clean-up continued as it was proceeding during my inspection, I expect that this Beach Wildrye community can be restored with fertilizer only. I do not believe a transplant operation will be necessary on LA15C. However, a fertilizer program similar to that recommended for KN408 should restore the site. I estimate two man days to complete the work.

REHABILITATION PLAN FOR THE  
FUEL STORAGE AREA AT EL-011

This small disturbance should be corrected after fuel storage tanks and related fueling structures are removed. The containment berms should be leveled to match existing contours and the entire area should be sprigged with Beach Wildrye and fertilized at a rate equal to 800 pounds of 20-20-10 per acre. Beach Wildrye transplants can be obtained from adjacent undisturbed stands. The transplant spacing should be four feet on center. After the grading work and equipment removal is complete, the restoration activity should take two man days.

ADDITIONAL NOTE

Ingot Island 022 has not been listed in this report, but the vegetation is showing signs of stress and should be monitored. Stress was noted in both the Beach Wildrye and wetland communities.

If you have any questions or if you require additional assistance in Beach Wildrye restoration or wetland rehabilitation, please contact me at 745-4469.

Sincerely,



Stoney J. Wright, Manager  
Alaska Plant Materials Center

SJW/ds

cc: Mark Broderson

1991 Feasibility Study Suggestions  
July 23, 1990

by no means agreed upon by all Alaskans that it is desirable for sea otters to expand further.

Para 2, sea otters - Delete this statement. This was not the consensus of the group. There is no factual information to support a recommendation that harvest be restricted.

IV-28 - I am assuming that this entire section on a sea lion disturbance study has been deleted. It is inappropriate and NMFS/ADF&G currently have ongoing studies at Marmot Island.

I have a suggestion for a marine mammal demonstration project on habitat use by harbor seals. Currently, we know nothing about site tenacity within or between years in PWS. We know nothing about seasonal movements, or about the relationship between harbor seals in PWS and the Copper River delta. These questions are all essential to assessing the impact of the 1989 oil spill, or of any other future action. Unless one has an indication of how readily animals switch haulout locations, how dependent they are on PWS on an annual basis, etc. it is impossible to assess the effects of damage to habitat or of disturbance and displacement. Harbor seals are currently declining, but not yet on the endangered list, so should be (but are not) receiving additional attention. Because we think they are relatively sedentary, they may be a good way to monitor the health of the sound. PWS is an ideal place to conduct such a study because of the spill focus, simple logistics, some historic data on numbers and diet. Without understanding dependence on particular places or habitat, it isn't possible to address restoration goals.

Estimated cost (if conducted by ADF&G, NMFS, and Texas A&M along with ongoing studies) would be \$40-50,000 for year 1 and approximately \$100,000 for year 2. Satellite transmitters would be attached to seals and monitored. Funding would include transportation, field logistics, purchase of satellite transmitters, satellite time, some salary, and analysis of data.

I hope these comments are helpful. I am sorry they were so long in coming, but the last few weeks have been hectic and I've spent less than a full week in the office since mid-May.

Sincerely,

Kathy Frost

Kathy Frost  
Marine Mammals Biologist  
Wildlife Conservation

cc: Stan Senner  
Don Calkins

## Coastal Habitat -Subtidal

### 1.0 Summary of potential damages (preliminary)

#### 1.1 Silled fjords

- Dead starfish, fish, infauna in anoxic layer in 1989
- Some recovery to epibenthos in 1990. (Data on infauna not analyzed)
- Possible sublethal effects on infauna (lesions on polychaetes) in 1990

#### 1.2 Laminaria and eelgrass habitats in bays

- Oil present in sediments to depths of 20 m
- Possible effects on infauna (not yet analyzed)
- Possible decrease in flowering of eelgrass
- Possible increase in parasitism of starfish (Dermasterias)

### 2.0 Recommendations for restoration

#### 2.1 No "direct restoration" is recommended

- Few indications of decrease in density or biomass of "restorable" populations such as eelgrass
- Lack of feasible restoration techniques

#### 2.2 Continued monitoring of damaged resources

- Emphasis on Laminaria and eelgrass habitats in bays and fjords
- Emphasis on infauna, eelgrass, starfish, forage fish and other potentially damaged resources

- Emphasis on monitoring rates of recovery or decline (especially declines due to secondary impacts such as lack of predation pressure)

### 2.3 Long term monitoring of indicator species in selected habitats

- Provide quantitative background data lacking in present damage assessment

## 3.0 Recommended research

3.1 Develop criteria for establishing paired impact and control sites and test their adequacy

3.2 Develop and test methods for sampling indicator species based on present results





## OIL SPILL RESTORATION PLANNING OFFICE

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437 E Street, Suite 301 Anchorage, Alaska 99501

(907) 271-2461 FAX: (907) 271-2467

October 19, 1991

### MEMORANDUM

**SUBJECT:** Restoration Work Sessions with PIs, PRs,  
and Senior Scientist

**FROM:** Brian D. Ross *Brian D. Ross*  
Restoration Planning Work Group

**TO:** Management Team, Legal Team

The Restoration Planning Work Group has organized a series of work sessions with the Senior Scientist, selected Peer Reviewers and Principal Investigators to be held October 25 - 31, 1990, at the Simpson Building in Anchorage. The purpose of this series of work sessions is to identify candidate restoration projects that can be considered for implementation in 1991, as well as to identify any need to conduct further feasibility studies on promising restoration technologies or approaches. Following the individual work sessions, RPWG will hold a synthesis meeting on November 1 - 2 with the Senior Scientist and representatives of the Legal Team to determine the overall suite of projects that are most appropriate to include in the December 28 Federal Register document ("draft Restoration Work Plan and 1991 Restoration Program"). A schedule of the meeting dates and the lists of participants invited to the Coastal Habitat, Fish/Shellfish, and Mammals sessions, is attached for your reference. (Participant lists for the Bird and Recreational Resources sessions should be available early next week.) Of course participation by the Management Team or other members of the Legal Team, is welcomed at any of these meetings.

In order to focus the work sessions, RPWG has developed draft lists of factors to be considered by the participants in discussing possible restoration projects and feasibility studies. These lists, intended to help guide discussions only, have been sent to the invitees and are also attached for your information. As you will notice, a primary factor for 1991 projects is a clear tie to injury.

This series of work sessions is critical to our ability to produce a scientifically credible document for publication in the Federal Register on the schedule we have been given. We look forward to frank and productive discussions so that we may proceed with development of the best possible proposals for 1991.

(ATTACHMENTS)

RPWG

Proposed Meeting Schedule

<u>Meeting</u>	<u>Date</u>	<u>RPWG Organizer</u>
Coastal Habitat/Intertidal	Oct 25	Dave
Recreation	Oct 26	Sandy, Art
Fish/Shellfish	Oct 26	Brian, John
Birds	Oct 30/31	Stan
Marine Mammals	Oct 31	John, Carol
RPWG Synthesis	Nov 1/2	All members

Invited Participants - Restoration Work Sessions

October 26, 1990

Fish/Shellfish

NAME	AFFILIATION	PHONE	FAX
Jeff Short	NMFS/Juneau	789-6600	789-6608
Pat Rounds	NMFS/Juneau	789-6600	789-6608
— Alex Wertheimer	NMFS/Juneau	789-6040	789-6094
Evan Haynes	NMFS/Juneau	789-6600	789-6608
Charles O'Clair	NMFS/Juneau	789-6016	789-6094
— Usha Varanasi	NMFS/Seattle	442-7737	442-2359
Dave Irons	USFWS/Anch	786-3396	562-2297
Will Barber	UA/FBX	474-7177	474-7204
Phil Mundy	CRIFC/Portland	(503) 238-0667	255-4228
Jeff Hartman	ADFG/FRED/Juneau	465-4160	465-4168
Doug McBride	ADFG/Sport/Anch	267-2227	522-1413
Doug Eggers	ADFG/Comm./Juneau	465-4210	465-2604
James Fall	ADFG/Subst./Anch	267-2359	349-1723
Sam Sharr	ADFG/Comm./Cordova	424-3212	424-3235
Kelly Hepler	ADFG/OSIAR/Anch	267-2218	522-1413
Evelyn Biggs	ADFG/Comm./Cordova	424-3212	424-3235
— Dave Cantillon	NMFS		
Bob Spies	Livermore Lab/Calif	(415) 422-5792	422-1370

Tom KRON

Invited Participants - Restoration Work Sessions

October 31, 1990

Marine Mammals

<u>NAME</u>	<u>AFFILIATION</u>	<u>PHONE</u>	<u>FAX</u>
Tom Loughlin	NOAA/Seattle	(206) 526-4045	526-6615
Marilyn Dahlheim	NOAA/Seattle	(206) 526-4045	526-6615
Larry Pank	USFWS/Anchorage		
Brenda Bellachey	USFWS/Anchorage	786-3570	869-3417
Jim Bodkin	USFWS/Anchorage		
Kathy Frost	ADFG/FBX	456-5156	456-3091
Lloyd Lowry	ADFG/FBX	456-5156	456-3091



# OIL SPILL RESTORATION PLANNING OFFICE

437 E Street, Suite 301 Anchorage, Alaska 99501  
 (907) 271-2461 FAX: (907) 271-2467

October 19, 1990

## MEMORANDUM

**SUBJECT:** Fish/Shellfish Restoration Work Session

**FROM:** Restoration Planning Work Group

**TO:** xxxx xxxxx  
 xxxx xxxxx

EXAMPLE

This is to formally request your participation in the Fish/Shellfish work session on restoration to be held on Friday, October 26, 1990, beginning at 8:30 A.M. The location will be the Simpson Building at 645 G Street, Anchorage, Alaska. The objectives of the work session are 1) to identify a candidate suite of actual restoration projects addressing known injuries from the oil spill that can be initiated in 1991; and 2) to identify the need for, and propose for the 1991 field season, further feasibility studies of promising restoration technologies or approaches.

Attached you will find two sets of factors to be considered in proposing either restoration projects or feasibility studies. If possible, please prepare a brief description of any proposed projects/studies for consideration at the work session, or submit any such proposals to this office prior to October 26 if you cannot attend. More detailed proposals will be requested by the Restoration Planning Work Group for those projects that best address the factors on the attached sheets.

Should you have any questions do not hesitate to call the Restoration Planning Office at (907)271-2461. Your attendance at this session is appreciated.

# DRAFT

## 1991 Restoration Projects - Factors to be considered in proposing projects

Agencies have decided to consider appropriate restoration projects for implementation in 1991. This is independent of whether any restoration funds become available in the immediate future from the responsible party. Proposed projects will be those that are technically feasible and can be implemented in the 1991 field season. Recovery being the prime goal, projects should also provide, either directly or indirectly, a net environmental benefit to an injured resource. These potential projects will include those that will mitigate known or documented damages and also any actions which will mitigate other sources of environmental disturbance (immediate threats) interfering with the natural recovery of injured resources. Finally, neither the timing nor the magnitude of any potential settlement for damages should be considered when proposing candidate projects. Factors to be considered include:

- 1) addresses known NRDA damage.
- 2) technical feasibility known.
- 3) reasonable to implement considering the expectations for natural recovery.
- 4) importance of implementing in 1991; examples include:
  - addresses an immediate/existing damage which would likely continue to cause impacts;
  - addresses the threat of additional (cumulative) impacts which, if eliminated, would allow a quicker recovery of an injured resource;
  - should be implemented immediately by the agencies even if funds from the responsible party are not yet available.
- 5) net environmental benefit expected.
- 6) ecosystem/multiple species benefits.
- 7) duration of project; expected results.
- 8) geographic scope (should not be restricted to PWS, unless that is the only area that damage may be effectively addressed at this time).
- 9) cost of implementation (cost effectiveness to be addressed by RPWG).

## 1991 Feasibility Studies - Factors to be considered in proposing studies

Proposed projects should reflect the need to determine technical feasibility or environmental benefit of candidate restoration approaches or techniques (i.e., those potential restoration projects specifically related to a damaged resource which, if technically feasible, have the likelihood of being realistically considered/implemented as a restoration measure). Besides technical feasibility, projects may also address information necessary to confirm the benefits or enable the implementation of a potential technique otherwise feasible. For example, one of the 1990 studies provided necessary information to confirm the use of upland forested areas as habitat for marbled murrelets and harlequin ducks. Factors to be considered include:

- 1) injury documentation; link to NRDA.
- 2) likelihood of project ultimately being proposed as a full-scale restoration measure.
- 3) probability of successful study.
- 4) ecological importance of target resource.
- 5) ability to evaluate success and document ecological value of project.
- 6) cost of feasibility study.

Invited Participants - Restoration Work Sessions

October 25, 1990

Coastal Habitat

NAME	AFFILIATION	PHONE	FAX
Roy Nowlin	ADFG	267-2136	522-3148
Ray Highsmith	UA/FBX	474-7836	474-7204
Andy Hooten	UA/FBX	474-7836	474-7204
John Karinen	NOAA/Juneau	789-6054	789-6094
Josh Schimmel	UA/FBX	474-7682	474-6967
Kim Sundberg	ADFG/Anchorage	267-2334	349-1723
Steve Jewett	UA/FBX	474-7840	474-7204
Don Boesch	UM/Maryland	(301) 228-9250	228-3843
Charles Peterson	UNC/N.Carolina	(919) 726-6841	962-8330
Jeep Rice	NOAA/Juneau	789-6020	789-6094
Mike Foster	USJSU/Calif.	(408) 755-8658	753-2826
Hal Kibby/Rich M.	EPA/ORD/Corvallis	(503) 420-4625	420-4799



RPWG

RESTORATION WORK PLAN SCHEDULE

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March 24, 1991	Publish final FR notice
March 15	FR notice to Office of FR
March 1	Complete review of and response to public comment
February 13	Close of public comment period

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December 28, 1990	Publish draft FR notice
December 21	FR notice to Office of FR
December 17-20	Revision of FR notice
December 17	Final comments due from WPG and State of Alaska
December 14	Final draft submitted to WPG
December 13	Trustee Council review and recommendation
December 12	Final draft submitted to Trustee Council through Management Team
December 7	Comments due from the Management Team
November 28	Draft 1991 work plan/1990 status report submitted to Management Team
November 12	Background sections and detailed outline of draft public document submitted to RPWG
October 10-11	RPWG meeting to adjust internal schedule and make assignments
October 5	Teleconference of Trustees and/or Washington Representatives
October 4	Circulate schedule and draft initial FR notice

United States  
Department of  
Agriculture

Forest  
Service

Alaska Region

Reply to: Oil Spill Meetings

Date: October 18, 1990

Subject: Restoration Planning Meeting 10/25/90

To: Hal Kibby (EPA), Art Weiner (ADNR), Roy Nowlin (ADF&G) Ray  
Highsmith (UAF), Andy Hootin (UAF), John Karinen (NMFS), Josh  
Schimel (UAF), Kim Sundberg (ADF&G), Steve Jewett (UAF), Pete  
Petersen (Peer Reviewer), Bob Spies (Chief Scientist), Jeep Rice  
(NMFS)

On October 25, 1990, a Coastal Habitat restoration work session is scheduled to be held starting at 8:30 am at the Simpson Building at 645 G. Street in Anchorage, Alaska. The purpose of the meeting is to review the results of the 1990 Fucus and intertidal invertebrate restoration feasibility studies, propose new restoration feasibility and restoration projects for 1991. The detailed agenda includes:

8:30 am	Introductions and opening discussion of purpose.....	Gibbons
8:45 am	Review of Fucus feasibility project.....	Kibby
9:00 am	Review of intertidal invertebrate feasibility project..	Hootin
9:30 am	Feasibility Studies/NRDA Damages.....	Gibbons
	(See Progress Report for guidelines)	
	Subtidal.....	Jewett
	Intertidal.....	Hootin Highsmith Karinén Weiner Kibby
	Supratidal.....	Schimel Kibby
12:00	Lunch	
1:00 pm	Restoration Projects/NRDA Damages.....	Gibbons
	(See Progress Report for preliminary list of factors)	
	Subtidal.....	Jewett
	Intertidal.....	Hootin et al
	Supratidal.....	Schimel et al