RPWG
J.J.

Expert's Name: Kelly Hepler & Suzy Mccaaron **Date:** 4 Dec '92

PART A

Injured resource Cutthroat trout

Green Island Estuary

Pre-spill population estimates for PWS ____________
(un-oiled)

juv. ~ <270mm

Post-spill population estimates for PWS 30% lower survival
(oiled)

[Metric used =]

Without intervention, to what percent of the pre-spill population estimate (or un-oiled estimate) will the population recover? Please provide a **single** estimate and then try to quantify your uncertainty by providing a range in percentages such that no more than 10 % of the **actual** degree of recovery falls outside of that range. (essentially, we are asking you to construct a 90% confidence interval)

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent) 100

Uncertainty (%) Upper 100%
Lower 70%

Without intervention, how many years will it take for the population to recover to the degree identified above? (If the degree of recovery described above is negative, this estimate will represent the amount of time for the population to decline.) Again, please provide single estimate in years, and envision a 90% confidence interval.

Expected time to recovery (yrs) 13 (2005)

Uncertainty (yrs) Upper 19
Lower 09

Assumptions?

Habitat: Forage quality is good.
Nothing additional happens to the habitat

Disturbance:

Harvest (mortality): Fishing level is constant at 10%

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Had the Exxon Valdez Oil Spill **not** occurred, where would you expect the population to be in ________ years (the number of years provided above as the expected recovery time)?

Expected status (% of pre-spill) ____________

Green Island probably on decline due to over fishing pre-spill

Eshamy " " " " " "

PART B

Option (suboption) under consideration Increase fisheries management

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 100
Lower 70%

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 6 1998

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 13
Lower 6

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

determine maximum sustained yield
Fishable areas, access etc...

Are any assumptions different from those we identified under natural recovery?

We are treating this now ~~as~~ with the sport-fishing closure.
~~fish or~~ all stocks spawning in oiled areas.

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper__________
Lower__________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet, Kodiak/Alaska Peninsula and/or Prince William Sound}

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%) 10%/year Uncertainty (%) ~~10~~ 5%

Assumptions?

We don't know what the carrying capacity so do not know how much can be added.

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

With or without plan - ADF&G will have closure, may be more conservative without plan..

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

PART B

Option (suboption) under consideration Update anadromous catalogs.

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100%

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 100%
Lower 80%

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 13

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 19
Lower 09

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Assumption - there will be no further hab. deg. to important hab.

Are any assumptions different from those we identified under natural recovery?

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)____________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper________
Lower________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound}

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ____________

Assumptions?

No.

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

PART B

Option (suboption) under consideration protection of private lands

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 100
Lower 80%

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 13

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 19
Lower 09

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

We are assuming no major impacts or development on private lands in Western PWS.

Are any assumptions different from those we identified under natural recovery?

No.

marine conditions are probably more important (limiting)

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No) Important

Maybe

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%) -100

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper ____
Lower -100 (50% certainty that loss)

Assumptions: fully developed lands and increased access or traffic we could drive the population to extinction.

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%) ____ Uncertainty (%) ____

Assumptions?

No

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

PART B

Option (suboption) under consideration Special designations

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 100
Lower 70

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 13

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 19
Lower 09

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Would not be so restrictive as to prevent fishing
Would prevent further degradation

Are any assumptions different from those we identified under natural recovery?

There are little foreseeable impacts in marine waters or public uplands.

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)__________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper___________
Lower___________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) _______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

All three are added (except)

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years) 6

Uncertainty (yrs) Upper 13
Lower 6

Assumptions...

Other options
stocking is not a viable option for cutthroat or Dolly's

Differences with Dolly's

larger population
middle of range
greater migration
less concern

Did not add
these comments

Expert's Name: Ray Hilborn **Date:** 16 Dec '92

PART A

Injured resource Cutthroat Trout

Pre-spill population estimates for PWS (un-oiled) ____________________

Post-spill population estimates for PWS (oiled) ____________________

[Metric used =]

Without intervention, to what percent of the pre-spill population estimate (or un-oiled estimate) will the population recover? Please provide a **single** estimate and then try to quantify your uncertainty by providing a range in percentages such that no more than 10 % of the **actual** degree of recovery falls outside of that range. (essentially, we are asking you to construct a 90% confidence interval)

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent)______

Uncertainty (%) Upper __________
Lower __________

Without intervention, how many years will it take for the population to recover to the degree identified above? (If the degree of recovery described above is negative, this estimate will represent the amount of time for the population to decline.) Again, please provide single estimate in years, and envision a 90% confidence interval.

Expected time to recovery (yrs)________

Uncertainty (yrs) Upper_______
Lower_______

Assumptions?

Habitat:

Disturbance:

Harvest (mortality):

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Had the Exxon Valdez Oil Spill **not** occurred, where would you expect the population to be in ________ years (the number of years provided above as the expected recovery time)?

Expected status (% of pre-spill) ____________

PART B

Option (suboption) under **consideration**____________________________

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper___________
Lower___________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)_________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper___________
Lower___________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) _______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART B

Option (suboption) under **consideration**___________________________

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper___________
Lower___________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper__________
Lower__________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound}

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART B

Option (suboption) under **consideration**______________________________

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper___________
Lower___________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)_________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper___________
Lower___________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

PART B

Option (suboption) under **consideration**______________________________

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)_________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper____________
Lower____________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)__________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper____________
Lower____________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ________________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)_________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper__________
Lower__________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound}

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

Expert's Name: Brad Andres **Date:** 12/10/92

PART A

Injured resource Black Oystercatchers

Pre-spill population estimates for PWS (un-oiled) 950 (84)

Post-spill population estimates for PWS (oiled) 800 (89,90,91)

[Metric used = oil vs unoiled pop]

significant decline in oiled areas pre + post in 89 + 90

Without intervention, to what percent of the pre-spill population estimate (or un-oiled estimate) will the population recover? Please provide a **single** estimate and then try to quantify your uncertainty by providing a range in percentages such that no more than 10 % of the **actual** degree of recovery falls outside of that range. (essentially, we are asking you to construct a 90% confidence interval)

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent) 100 %

Birds aren't totally abandoning oiled sit

Uncertainty (%) natural varia. Upper 120 Lower 80

Any spill effects wouldn't show up for 4 yrs after the spill

Without intervention, how many years will it take for the population to recover to the degree identified above? (If the degree of recovery described above is negative, this estimate will represent the amount of time for the population to decline.) Again, please provide single estimate in years, and envision a 90% confidence interval.

Expected time to recovery (yrs) 30 (2 generations)

Uncertainty (yrs) Upper 45 (3 generations)
Lower 15 (1 generation)

Assumptions?

Habitat: No change

Disturbance: 92 levels of disturbance

1) BLOYs generation time 15 years, sexual maturity at 4 years

Harvest (mortality): None

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Had the Exxon Valdez Oil Spill **not** occurred, where would you expect the population to be in 30 years (the number of years provided above as the expected recovery time)?

Expected status (% of pre-spill) 100

We are near center of range, population likely to be fairly stable.

PART B

Option (suboption) under consideration Mussel beds

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper ____
Lower ____

No change

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) ____ No change

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper ____
Lower ____

No change

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

- Dense beds are less important than the smaller aggregates for birds. If you can't clean the smaller areas it may not be effective.

Are any assumptions different from those we identified under natural recovery?

PART B

Option (suboption) under consideration Accelerate recovery

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper___________
Lower___________

No change

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)_________ No change

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper___________
Lower___________

No change

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

Fucus may naturally recover w/o intervention

PART B

Option (suboption) under consideration Purchase lands

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper__________
Lower__________ No change

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)________ No change

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the actual recovery time required will fall outside of this range.

Uncertainty (yrs) Upper__________
Lower__________ No change

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

Port Chalmers

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No) There is a preference for certain habitat areas

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate) no - not on private land

Estimated negative impact (%)__________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper___________
Lower___________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound? yes, possibly
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

- If large areas of coastal habitat are in private land, ie Afognak, possibly.

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) _______________

Assumptions?

PART B

Option (suboption) under consideration Special Designation

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper__________
Lower__________ No change

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)________ No change

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper__________
Lower__________ No change

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your single best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%) 75 continued decline

Please try to quantify your uncertainty such that there is only a 10 percent chance that the actual impact will fall outside of this range.

Uncertainty (%) Upper 85
Lower 65

Assumptions:
If there are going to be major management Δs, if timber harvest increased, particularly around Green + Montague. Accelerated tourism may also ↓ pops.

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound}

Same

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further? NO

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

The options to eliminate mussel beds + accelerate upper intertidal recovery are too localized to make a population difference

Expert's Name: Michael Fry **Date:** 16 Dec '92

PART A - Natural Recovery

Injured resource Black Oystercatcher

Pre-spill population estimates for PWS (un-oiled) 688 (1985) 1989 ~700 slight increase expected

Post-spill population estimates for PWS (oiled) 580 post spill

survival of young

Degree of recovery without intervention:

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent) 100

recovery & ~~dist~~ dispersal from unoiled area

Uncertainty (%) **Upper:** 120% **Lower:** 90

Recovery time needed without intervention:

Expected time to recovery (yrs) 7

Assuming 300 breeding pair with 10% increase

Uncertainty (yrs) **Upper:** 10 **Lower:** 5

Assumptions?

Habitat: Assuming 40% of breeding pop in oiled area so their growth

Disturbance: rate would be less than 10%

Harvest (mortality):

Data not in report showed highly significant x in # of none breeding pairs on oiled area

Also showed survival rate of chicks was sign. less.

44% of birds were in oiled areas in 1985 (D. Irons) 688 birds tot

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Had the Exxon Valdez Oil Spill not occurred, where would you expect the population to be in ___ years?

Expected status (% of pre-spill) 700

in 1989 more were in unoiled areas (130 vs 259 so ~50%
(172 vs 630 so ~25 July
(259 vs 359 so August

possible explanations:
if difference due to mo...
the 120 birds lost or
could be shift in mover

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART B

Option (suboption) under consideration cleaning oiled mussels

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper______
Lower______

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 5

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 10
Lower 4

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

* Assumption big mussel beds are 20% total mussels with 40% of oil. Also assume cleaning capability is 50% so can reduce oiling by 20%.

river.

Outside of PWS - injury should be less & recovery efforts would less effective (by 1/2) in other areas

Are any assumptions different from those we identified under natural recovery?

PART B

Option (suboption) under consideration Upper intertidal zones

Based on your scientific understanding, please provide a single, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper ______
Lower ______

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 6

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the actual recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 10
Lower 4

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Assume benefit is more than linear to proportion area treated by providing nuclei. Need to apply ~~to~~ ?10% of area to improve breeding by 20% in 2/3rd yr.

- By covering some of forage area would reduce predation pressure and allow for more rapid limpet recovery

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART B

Option (suboption) under consideration Special designation

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper___________
Lower___________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 5 1/2 in localized areas

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 8
Lower 4

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Closures around herring or salmon spawning areas, could affect productivity (double it) by providing rich food during PL

Are any assumptions different from those we identified under natural recovery?

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions? Carrying capacity?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper__________
Lower__________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

Resource	Population declining Pre-spill?	Injury Populat'n Level	Injury Sublethal Effects	Option Name	Option No.	Recovery Objective	Effectiveness Rating	Other Colums for Karen		
Black Oystercatcher ,		Yes	Yes	Natural Recovery		pre-spill populations				
				Eliminate Oil from Mussel beds	13	pre-spill populations				
				Acc. recovery of intertidal	14	pre-spill populations				
				Purchase Habitat	37	pre-spill populations				
				Special Designations	40	pre-spill populations				
Marbled Murrelets	Yes	Yes	Yes	Natural Recovery		Replace the 20,000 list in spill				
				Minimize Incidental take of Comm. Fish	9	Replace the 20,000 list in spill				
				Habitat Acquisition	37	Replace the 20,000 list in spill				
				Special Designations	40	Replace the 20,000 list in spill				
Pigeon Guillemots	Yes	Yes	Yes	Natural Recovery		Equalize oil & unoiled				
				Land Acquisition	37	Equalize oil & unoiled				
				Special Designations	40	Equalize oil & unoiled				
				Limit preditor access to colonies.	17.2	Equalize oil & unoiled				
Common Murre		Yes	Yes	Natural Recovery		pre-spill pop				
				Reduce Disturbance; Buffer zone	4	pre-spill pop				
				Education; reduce disturbance	??	pre-spill pop				
				Enhance Social Stimuli	16.1	pre-spill pop				

				Improve Physical characteristics of nest sites	16.2	pre-spill pop				
				Reduce predation	17.2	pre-spill pop				
				Habitat Acquisition	37	pre-spill pop				
				Special Designations	40	pre-spill pop				
Wild-stock Pink Sal.		??	Yes	Natural Recovery						
Herring		unk	Yes	Natural Recovery						

Brian — Andres

Very Approx thousands to 10,— in the state
IN spill prob < 3,—

Expert's Name: Brian Andres **Date:**

PART A

Injured resource Black Oystercatchers

Pre-spill population estimates for PWS ~~(un-oiled)~~ Ball-Park 950, (1984)

Post-spill population estimates for PWS ~~(oiled)~~ 800 ($\bar{X}$ for 89-91)

Pop ↓ing in 89 & 90, in the oil areas but not in unoiled. 91 = NOΔ

[Metric used =]

Without intervention, to what percent of the pre-spill population estimate (or un-oiled estimate) will the population recover? Please provide a single estimate and then try to quantify your uncertainty by providing a range in percentages such that no more than 10 % of the actual degree of recovery falls outside of that range. (essentially, we are asking you to construct a 90% confidence interval)

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent) 100% Rebound to the level of Natural Variat'n, but unsure what that level is.

Uncertainty (%) mostly nat. var **Upper** 120 **Lower** 80 *

Without intervention, how many years will it take for the population to recover to the degree identified above? (If the degree of recovery described above is negative, this estimate will represent the amount of time for the population to decline.) Again, please provide single estimate in years, and envision a 90% confidence interval.

Expected time to recovery (yrs) 30 2 generat'ns

Uncertainty (yrs) **Upper** 15 1 generat'n **Lower** 45 3 "

Assumptions?

Habitat: Avail Hab ≈ the same. Logging not current but past indirect hab.

Disturbance: No Sig Δs in dist.

* No Recruit in Spill area They don't breed until 4 yrs after so won't know next year breeding affect.

* Assume 1 generat'n = 15 yrs for BLOY (partly unknown)

Harvest (mortality): None we know of.

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Had the Exxon Valdez Oil Spill **not** occurred, where would you expect the population to be in 30 years (the number of years provided above as the expected recovery time)?

Expected status (% of pre-spill) 950.

PART B

Option (suboption) under consideration Elim Oil from Mussel Beds

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100%

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper __________
Lower __________

No A

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) ________ No A

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the actual recovery time required will fall outside of this range.

Uncertainty (yrs) Upper __________
Lower __________

No A

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Same as Nat Recovery.

as much as the dense beds.

Are any assumptions different from those we identified under natural recovery?

Oystercatchers use the disagg beds. Chance that they overlay with Bloy fairly small.

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)____________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the actual impact will fall outside of this range.

Uncertainty (%) Upper____________
Lower____________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound}

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)_________ Uncertainty (%) ________________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

Brian Andres - BLOY

PART B

Option (suboption) under consideration Pvt Land Acq.

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100%

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper__________
Lower__________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) NO Δ

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper__________
Lower__________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

No High ƒ areas under immediate threat by pvt. 0% Prob no Δ. especially cause sr. sparsley dist thru PWS. ~~Essentially similar outside PWS~~ ~~for~~ Tdk see note next pg

PART C

Yes for certain

for certain types of shorelines those types are occupied & only 50 [illegible] at best not pvt land

Do you believe that the habitat which is protected by this option is limiting for the resource? ~~Yes~~ or No ; Pref

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Not Really, but unsure of Hat => CdU Area.

Estimated negative impact (%)__________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper___________
Lower___________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound}

Could be a little more eff on Afognak cause unsure of Hat use there

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

Brian Andres - BLOY

PART B

Option (suboption) under consideration Acc Recovery of Upper Intertidal.

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________ NO

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper___________
Lower___________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)_________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper___________
Lower___________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

Fucus will come back on its own, & thus no effect on BLOY recovery.

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your single best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)__________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the actual impact will fall outside of this range.

Uncertainty (%) Upper___________
Lower___________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound}

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) _______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

Brian Andres-BLOY

PART B

Option (suboption) under consideration Sp Des

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100% - If P

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) **Upper**________
Lower________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper________
Lower________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

Not w/in PWS. Mgmt Δs in Green & Montague could have an effect. Major logging dist in part these areas could have sig effect. Also could have impacts of sig ↑ in Tourism, OSD on Green & N. Montague

PART C Tourism or Logging,

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your single best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%) 75% If P Timber hyst & LJF ~~east~~ around area of Montague (not inc. the one way so.)

Please try to quantify your uncertainty such that there is only a 10 percent chance that the actual impact will fall outside of this range.

Uncertainty (%) Upper 85% — what is now
Lower 65%

Assumptions:

Majo

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

~~[illegible]~~ See Carol.

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

No.

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

Opt'ns seem pretty indep.

Expert's Name: Michael Fry **Date:** 3 Dec '92

PART A

Injured resource Bald Eagles

Pre-spill population estimates for PWS 2,200 pairs
(un-oiled)

Post-spill population estimates for PWS 2,000 breeding pairs
(oiled)

[Metric used = pre/post] mortality of juveniles not accounted for. Probably higher juvenile

Without intervention, to what percent of the pre-spill population estimate (or un-oiled estimate) will the population recover? Please provide a **single** estimate and then try to quantify your uncertainty by providing a range in percentages such that no more than 10 % of the **actual** degree of recovery falls outside of that range. (essentially, we are asking you to construct a 90% confidence interval)

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent) 100%

Uncertainty (%) Upper 110
Lower 90

Without intervention, how many years will it take for the population to recover to the degree identified above? (If the degree of recovery described above is negative, this estimate will represent the amount of time for the population to decline.) Again, please provide single estimate in years, and envision a 90% confidence interval.

Expected time to recovery (yrs) 3 from spill.

Uncertainty (yrs) Upper 1
Lower 4

Assumptions?

Habitat: Pink salmon have helped by providing more food during nesting

Disturbance:

limiting factor may be territory size

increased breeding over last 10 yrs, protected.
Breeding population is at carrying capacity in PWS

Harvest (mortality):

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Had the Exxon Valdez Oil Spill **not** occurred, where would you expect the population to be in ________ years (the number of years provided above as the expected recovery time)?

Expected status (% of pre-spill) ____________

PART B

Option (suboption) under **consideration** land acquisition

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper___________
Lower___________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)_________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper___________
Lower___________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Assuming that nesting habitat remains constant at 1992 le

Are any assumptions different from those we identified under natural recovery?

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

18%

Estimated negative impact (%) 2200 → 1900 pairs over 40 yrs

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper 0 25 yrs
Lower 30 60 yrs

Assumptions:
Decrease would not be linear. Potential nesting trees could be lost

* Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? (Note: repeat Part B or C for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

Proportional to available trees

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%) 0 Uncertainty (%) 10%

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

Chance of preventing decline is 60-70%.

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

PART B

Option (suboption) under consideration Special Designation

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper__________
Lower__________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)_________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper__________
Lower__________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Protection of herring spawn. Locally important but less than 5% effect on overall PWS pop.

Are any assumptions different from those we identified under natural recovery?

Health of population improved. May have greater fledging success and those juv. may leave the area.

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your single best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the actual impact will fall outside of this range.

Uncertainty (%) Upper__________
Lower__________

Assumptions:

Existing conditions.

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

Greater importance in areas of greater logging or greater human disturbance.

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

Expert's Name: Mike Fry **Date:** 12/3/92

PART A

Injured resource Bald Eagle

Pre-spill population estimates for PWS 4400 adult breeding birds
(un-oiled)

Post-spill population estimates for PWS 4000 adult breeding birds mortality 500-1000
(oiled) (Mortality of juveniles may have been greater than adults)

[Metric used = only counted white-headed birds]

Without intervention, to what percent of the pre-spill population estimate (or un-oiled estimate) will the population recover? Please provide a **single** estimate and then try to quantify your uncertainty by providing a range in percentages such that no more than 10 % of the **actual** degree of recovery falls outside of that range. (essentially, we are asking you to construct a 90% confidence interval)

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent) 100

Uncertainty (%) Upper 110
Lower 90

Without intervention, how many years will it take for the population to recover to the degree identified above? (If the degree of recovery described above is negative, this estimate will represent the amount of time for the population to decline.) Again, please provide single estimate in years, and envision a 90% confidence interval.

Expected time to recovery (yrs) 3 yrs from spill

Uncertainty (yrs) Upper 1 yr. from spill
Lower 4 yrs from spill

Assumptions?

Habitat: (1) Pink salmon fishery has helped bald eagle, no no lack of food (2) increase in eagle pop in last 10 years due to salmon or federal protection

Disturbance:

(3) Breeding population in PWS is at carrying capacity
(4) After spill, productivity ↑ when compared to non-spill area. Population limited breeding success prior to the spill. (5) Territories are all occupied

Harvest (mortality):

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Had the Exxon Valdez Oil Spill **not** occurred, where would you expect the population to be in ________ years (the number of years provided above as the expected recovery time)?

Expected status (% of pre-spill) ____________

PART B

Option (suboption) under **consideration** Land Acquisition

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100 ~~No change~~

~~400~~
2200

1800

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) **Upper** 110
Lower 90 ~~No change~~

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 3

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 1
Lower 4

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Available habitat unchanged and remains at 92 levels

Are any assumptions different from those we identified under natural recovery?

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%) (2200 - 1800) -18% over 40 years
Continued Logging will further limit nesting habitat

Please try to quantify your **uncertainty** such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper 0
Lower -30

(Not a linear decrease which will occur later as potential new nesting trees are not available to the population)

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)
Logging on Afognak or other areas may cause similar changes.

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%) 0 Uncertainty (%) 10

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

60 to 70 % chance of preventing declin

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

PART B

Option (suboption) under consideration Special Designations

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 110
Lower 90

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 3

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 1
Lower 4

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

- Herring spawn used by eagles during egg formation
- Restrict herring spawn harvest
- Little effect on eagles due to widespread distribution throughout the Sound.

Are any assumptions different from those we identified under natural recovery?

- May be an increase in productivity which may help population elsewhere
- NO real Δ w/in PWS

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%) - no change -

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper 0
Lower -30

Assumptions:
Existing management of eagles fully adequate

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound}

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

—

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

Unknown

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

Expert's Name: Tim Bowman   Date: 9 Dec '92

PART A - Natural Recovery

Injured resource ~~[illegible]~~ Bald Eagle

Pre-spill population estimates for PWS (un-oiled)   Total 4439 ± 981

Post-spill population estimates for PWS (oiled)   4125 ± 860 (1990)

Degree of recovery without intervention:

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent) 100

Uncertainty (%)   Upper: 110
Lower: 100

Recovery time needed without intervention:

Expected time to recovery (yrs) 4

Uncertainty (yrs)   Upper: 6
Lower: 3
Uncertainty on variables that were used in population model

Assumptions?

Habitat: Assuming the 1990 reproductive success.
Breeding population ~~is~~ at or near carrying capacity

Disturbance:

Harvest (mortality): Food availability

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Had the Exxon Valdez Oil Spill not occurred, where would you expect the population to be in 5 years?

Expected status (% of pre-spill) 4600

PART B

Option (suboption) under consideration Protection of private lands

Based on your scientific understanding, please provide a single, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper______
Lower______

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 4

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the actual recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 6
Lower 3

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

PART C

Do you believe that nesting habitat ~~the habitat which~~ is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your single best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the actual impact will fall outside of this range.

Uncertainty (%) Upper 100% — logging would not significantly affect
Lower 85% — some loss of nesting and possibly foraging estimates.

Assumptions:

Part D

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%) 110 Uncertainty (%) 10%

Assumptions?

Population was increasing slightly pre-spill

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

100%

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

PART B

Option (suboption) under consideration special designations

Based on your scientific understanding, please provide a single, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper ___________
Lower ___________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 4

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the actual recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 6
Lower 3

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your single best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the actual impact will fall outside of this range.

Uncertainty (%) Upper 100
Lower 85

will not have much effect on public lands so this reflects logging on private lands.

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

Uncertain

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ____________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

Feeding areas are most critical in late winter when there is little disturbance.

Expert's Name: Tim Bowman **Date:** 9 Dec 1992

PART A - Natural Recovery

Injured resource Bald Eagle

Pre-spill population estimates for PWS (un-oiled) 4439 ± 981

Post-spill population estimates for PWS (oiled) 4125 ± 860 (1990)

Degree of recovery without intervention:

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent) 100

Uncertainty (%) Upper: ~~100~~ 110
Lower: 100

Recovery time needed without intervention:

Expected time to recovery (yrs) 4

Uncertainty (yrs) Upper: 6
Lower: 2
Uncertainty in variables used in population model

Assumptions?

Habitat:

Disturbance:

Harvest (mortality):

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Had the Exxon Valdez Oil Spill **not** occurred, where would you expect the population to be in 5 years?

Expected status (% of pre-spill) 4600

PART B

Option (suboption) under consideration Private Land Acquisition

Based on your scientific understanding, please provide **a single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper ~~100~~ 110
Lower ~~100~~ 100

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 4

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 6
Lower 2

No change

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

Bald Eagles

PART C Private Land Acquisition

C

Do you believe that the habitat which is protected by this option is limiting for the resource? Yes or No nesting Because habitat is at carrying capacity

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%) 92.5

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper 100
~~Lower~~ 85 - some loss of nesting and possibly foraging areas and some disturbance that may cause repro failures.

Assumptions: Logging would not significantly affect habitat
this assumption drives the upper end

Part D

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

AP, Kodiak - eagles nest in non-forested areas which are limiting and lack of large scale forested areas further limits habitat and exacerbates potential negative effects of logging. The lower range of the uncertainty would be decreased. The Kenai/C would be intermediate between PWS + other areas.

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels? Yes

Expected value (%) 110 Uncertainty (%) 10%

Assumptions?

Population is currently at or near carrying capacity and may, under optimal conditions, increase by 10%.

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the **proposed** restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

~~[illegible]~~ 100%

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

PART B

Option (suboption) under consideration Special Designations

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 110
Lower 100

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 4

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 6
Lower 2

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

Overall, what do you think ...

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No) Because resting area may be at carrying capacity

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)__________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper 100
Lower 85 +

Assumptions: this option will not affect eagles much on public lands

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

Unsure, but not likely to be different

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) _______________

Assumptions?

Bob Loeffler

Sdt: Xpert Form

B.C.

Expert's Name: Karen Oakley **Date:** 12/7/92

PART A

Injured resource Pigeon Guillemot

get C.G.

Pre-spill population estimates for PWS (un-oiled) 15,000

Post-spill population estimates for PWS (oiled) 3,000 - 6,500

declined substantially in unoiled
" in oiled = > unoiled
get Karen Laing

[Metric used = oiled v. unoiled]

Without intervention, to what percent of the pre-spill population estimate (or un-oiled estimate) will the population recover? Please provide a **single** estimate and then try to quantify your uncertainty by providing a range in percentages such that no more than 10 % of the **actual** degree of recovery falls outside of that range. (essentially, we are asking you to construct a 90% confidence interval)

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent) 100% of unoiled -

Uncertainty (%) Upper 100% of unoiled -
Lower ~~100% of~~

Without intervention, how many years will it take for the population to recover to the degree identified above? (If the degree of recovery described above is negative, this estimate will represent the amount of time for the population to decline.) Again, please provide single estimate in years, and envision a 90% confidence interval.

Expected time to recovery (yrs) <20 years

Uncertainty (yrs) Upper_______
Lower_______

Answerable, but need to place around

Assumptions?

Habitat: Not Important

Disturbance: Not Important

1. Don't know what's really going on.
2. Overall pop still ↓ing. [illegible]
3. Populat'n (non-spill) effects = dist throughout PWS.

Harvest (mortality): N/A

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Had the Exxon Valdez Oil Spill **not** occurred, where would you expect the population to be in 20 years (the number of years provided above as the expected recovery time)?

Expected status (% of ~~pre-spill~~ unoiled) ?

— Still exist, ~~but in~~ but in lower #s.

—

PART B

Option (suboption) under consideration Land Acquisition

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100% – (No Δ from Nat Recovery)

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 100% {No Δ} – Pisas not ~~[illegible]~~ part to dist surf!
Lower → 100%, prob No Δ. → Permittics prob take care of it

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)________ No Δ

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper___________
Lower___________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

see above

PART C Land Acquisition

Do you believe that the habitat which ~~is~~ protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate) Development over every inch of coastline.

Not realistic in realistic scenario

Estimated negative impact (%) ?

No Realistic Scenario

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper___________
Lower___________

Assumptions: ~~Creris~~ See Carol G.

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

No idea what's going on outside of PWS.

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

N/A

Summary for Parts B-E: (Land Acquisition)

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

PART B

Option (suboption) under consideration Special Designations

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________ Won't hurt, but prob no help

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper__________
Lower__________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper__________
Lower__________

Be helpful, but don't know it will Δ anything.

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

- Could ID time critical stuff to avoid,
- Doesn't look like [illegible] disturbance is a problem

Are any assumptions different from those we identified under natural recovery?

PART C (Special Designations)

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No) Incl. Marine Forage & feeding habitat. F

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%) ____________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper____________
Lower____________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

No Info outside PWS

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)_________ Uncertainty (%) _________________

Assumptions?

Summary for Parts B-E: (Special Designations)

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

PART B

Option (suboption) under consideration Predator Control (foxes, v river otter)

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) >100%

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper >100%
Lower 100%

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) Effect but unsure how much

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper__________
Lower__________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

PART C (Predator control)

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)__________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper__________
Lower__________

Assumptions:

→ Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

Summary for Parts B-E: Predator Control

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

N/A only 1 effect opt

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

To do: keep monitoring pop
know how important Naked Is is to PWS

Carol G

Expert's Name: Karen Oakley **Date:** 12/7/92

PART A

Injured resource Pigeon Guillemots

Pre-spill population estimates for PWS (un-oiled) 15,000

Post-spill population estimates for PWS (oiled) 3000 - 6500

[Metric used = oiled vs. unoiled areas] ~~population decline compared to pre-spill~~

(Decline occurred prior to the spill)

Without intervention, to what percent of the pre-spill population estimate (or un-oiled estimate) will the population recover? Please provide a **single** estimate and then try to quantify your uncertainty by providing a range in percentages such that no more than 10 % of the **actual** degree of recovery falls outside of that range. (essentially, we are asking you to construct a 90% confidence interval)

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent) 100 oiled + unoiled — no recovery likely. Likely to continue to decline

Uncertainty (%) Upper 100
Lower 2.

Without intervention, how many years will it take for the population to recover to the degree identified above? (If the degree of recovery described above is negative, this estimate will represent the amount of time for the population to decline.) Again, please provide single estimate in years, and envision a 90% confidence interval.

Expected time to recovery (yrs) <20 years If other factors weren't affecting the population

Uncertainty (yrs) Upper
Lower 5 — 5 years to reproductive maturity

Potential to worsen with declining pop. [illegible]

Assumptions?

Habitat:

The effects of oil in other areas have been reversed relatively quickly — [illegible]

Disturbance:

① Effects of oil on populations which are causing the spill [illegible] are equally distributed across the Sound

② Whole population [illegible]

③

Harvest (mortality):

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Had the Exxon Valdez Oil Spill **not** occurred, where would you expect the population to be in 20 years (the number of years provided above as the expected recovery time)?

Expected status (% of pre-spill) ____________ not extinct still exist but lower than pre + post spill #'s.

PART B

Option (suboption) under consideration Land Acquisition

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100 No change - not nesting habitat

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 100
Lower 100 } same as before

not likely to be affected. Pigeons are not particularly susceptible to disturbance

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)________ } No change

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper________
Lower________ } No change

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

1. Existing permitting will likely protect [illegible] [illegible]
[illegible]

PART C (Land Acquisition)

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%) none

Intensive Development over the coastline - not necessarily realistic

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper ____________
Lower ____________ = Puget Sound scenario?

Assumptions: 1- Nesting habitat is not limited. Habitat is vacant due to lower #'s of birds.

Is there reason to expect the effects of this option to be different outside of Prince William Sound? Unknown - No info at all

If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

PART E NA

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%) ________ Uncertainty (%) ______________

Assumptions?

Summary for Parts B-E: Special Designations

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

PART B

Option (suboption) under consideration Special Designations

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Predator control

Expected recovery (%) 100 — 7100

may help on a local [illegible]

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 100 — 7100
Lower ________ — 100

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

May be twofold

Expected time to recovery (yrs)________ — Unknown

[illegible]

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper________
Lower________

Unknown

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

1- Won't hurt, similar to land acquisition
2- Although there could be time constraints which could minimize impacts.

Are any assumptions different from those we identified under natural recovery?

① Don't know what prey to target

② [illegible]

PART C (Special Designations)

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No) feeding habitat, still uncertain

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)__________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper___________
Lower___________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound? No info

If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

Outside PWS- Foxes

- generally more inaccessible to fox.

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) _______________

Assumptions?

Summary for Parts B-E: (Special Designations)

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

~~**PART F** (To be completed after parts A-E have been addressed for all relevant restoration options)~~

~~Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?~~

~~What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)~~

~~Expected value (years)______~~

~~Uncertainty (yrs) Upper__________~~
~~Lower__________~~

~~Assumptions...~~

Add'l options

- Continue to monitor pop
- Determine how imp Naked Island is to the Sound
- Winter habitat ?

Expert's Name: Dan Roby **Date:** 8 Dec '92

PART A

Injured resource Pigeon guillemots

Northern Gulf

Pre-spill population estimates for PWS (un-oiled) 30,000 10-12,000 PWS Kathy Kul

Post-spill population estimates for PWS (oiled) 5,000

[Metric used =]

Without intervention, to what percent of the pre-spill population estimate (or un-oiled estimate) will the population recover? Please provide a **single** estimate and then try to quantify your uncertainty by providing a range in percentages such that no more than 10 % of the **actual** degree of recovery falls outside of that range. (essentially, we are asking you to construct a 90% confidence interval)

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

we will likely lose the aggregation of breeding pairs

Expected recovery (percent) -50%

Uncertainty (%) Upper ~~300~~ -10
Lower ~~[illegible]~~ ~~[illegible]~~ -75%

Without intervention, how many years will it take for the population to recover to the degree identified above? (If the degree of recovery described above is negative, this estimate will represent the amount of time for the population to decline.) Again, please provide single estimate in years, and envision a 90% confidence interval.

Expected time to recovery (yrs) 20 yrs to stabilize at -50%

Uncertainty (yrs) Upper ∞ represents the potential that it will stabilize at more than -50
Lower ~~[illegible]~~ 10 yrs

Assumptions?

Habitat: Decline appears to be food supply related (sculpin & blennies seem to be primary food) Next 2-3 yrs hydrocarbons not a problem.

Disturbance: Rate of predation doesn't change.

Harvest (mortality): Predation rates remain constant

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Residual hydrocarbons may be contributing to the decline because of food contamination.

Had the Exxon Valdez Oil Spill not occurred, where would you expect the population to be in 20 years (the number of years provided above as the expected recovery time)?

Expected status (% of pre-spill) -50

May make it more more likely that the population would stabilize above the -50%.

PART B

Option (suboption) under consideration reduce predator access

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) ~30 Naked Island population

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper -10
Lower -50

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

without control Naked Island.

Expected time to recovery (yrs) Doesn't know 10-15

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper
Lower

would buy more time 10-20 yrs but there are other factors that are driving the system down.

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

Naked Is. has ↑ % of pigu's population.
Mink population increasing and it doesn't take many to cause an effect on pigu's

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound}

Trend in Nothern Gulf is the same, probably less in other regions but don't know.

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions? No

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART B

Option (suboption) under consideration Protection of private

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) -50%

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper -10
Lower -75%

Same as Nat. Rec.

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the actual recovery time required will fall outside of this range.

Uncertainty (yrs) Upper________
Lower________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your single best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%) -50%

Please try to quantify your uncertainty such that there is only a 10 percent chance that the actual impact will fall outside of this range.

Uncertainty (%) Upper________
Lower -75-80%

Assumptions:

Assuming fairly widespread logging causing erosion of crevices

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound}

Don't know. Afognak - it could be even more important because of the extent of harvest

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) _______________

Assumptions? No

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART B

Option (suboption) under consideration Special Designations

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) ~50

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper -10
Lower -75%

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) >20 yrs

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper________
Lower________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

minimize disturbance, dumping near local guillemot

Are any assumptions different from those we identified under natural recovery?

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)____________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the actual impact will fall outside of this range.

Uncertainty (%) Upper__________
Lower__________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound}

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions? No

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

~~No change~~
forestalling decline is additive.

Assumptions...

Need to focus on what factors are limiting. Without this information, we are guessing at other effects.

Expert's Name: Dan Roby **Date:** 8 Dec 92

PART A

Injured resource Pigeon Guillemots

Pre-spill population estimates for PWS (un-oiled) No. Gulf 30,000 PWS 10-12,000

Post-spill population estimates for PWS (oiled) 5,000

[Metric used =]

Without intervention, to what percent of the pre-spill population estimate (or un-oiled estimate) will the population recover? Please provide a **single** estimate and then try to quantify your uncertainty by providing a range in percentages such that no more than 10 % of the **actual** degree of recovery falls outside of that range. (essentially, we are asking you to construct a 90% confidence interval)

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent) -50% 2000 birds

Uncertainty (%) Upper -10% slight decline

Lower -75 to 80% > -100

not -100% no good indication of where trend will take it. Believes that at least a low decline will contin

Without intervention, how many years will it take for the population to recover to the degree identified above? (If the degree of recovery described above is negative, this estimate will represent the amount of time for the population to decline.) Again, please provide single estimate in years, and envision a 90% confidence interval.

Expected time to recovery (yrs) 20 yrs to stabilize (10-15 yrs at Naked I)

Uncertainty (yrs) Upper ~~5-10 yrs~~ 10 yrs

Lower ?

Assumptions?

Habitat: Once hc are out of sculpin & blennies, less dependence on sandlance. Further declines of pigus in aggregate areas.

Disturbance:

(4) Predation rates remain constant

(1) Population was declining before spill

(2) Decline likely food supply related - Decline ecosystem wide problem of food supply

Problem may be ecosystem wide problem of hc in food supply the

(3) Hunch is residual contamination of hc in food supply but that reproductive success will cease to

Harvest (mortality):

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?
Food supply variable is very unknown

Had the Exxon Valdez Oil Spill **not** occurred, where would you expect the population to be in 20 years (the number of years provided above as the expected recovery time)?

Expected status (% of pre-spill) -50

~~100~~ May happen sooner or may equilibrize at a lower # but not likely.

Populations in No. GOA show a general decline as well.

Dan Roby

PART B

Option (suboption) under consideration Reduce predator access to seabird colonies

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) ~~50~~ -30-~~50~~ 40%

Not going to change end point unless mink can be extirpated

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper ~~75%~~ -50
Lower -10

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 10-15 yrs

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper______
Lower______ | more time prior to reaching stability.

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

(1) Mink may be expanding their range
(2) Mink may be an important factor in egg + chick loss
(3) Mink control may be effective on a localized basis

Are any assumptions different from those we identified under natural recovery?

(4) It doesn't take many mink to be a problem to the success of pigu aggregates.
(5) May be a mink predation problem a Naked Island
(6) Naked I is at risk of a more rapid decline

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years) 30

Uncertainty (yrs) **Upper** ∞ no change
Lower 10

At the best we could forestall the decli

Assumptions...

Forage fish are likely to be a limiting factor but there is a real dearth of information on all the factors which may affect population decline.

Guillemots 

Assumptions: Assumes fairly widespread logging

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

Unknown
Afognak could be more vulnerable to logging or
Increased harvest potential infringe on
coastal timber may impact pigeons

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels? NO

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART B

Option (suboption) under **consideration** Special Designations

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) ~50

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound}

Same benefits. May be helpful in limited localized aggregations.

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART B

Option (suboption) under consideration Land Acquisition

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________ no change

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper ~~60 to 70~~ no change
Lower___________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)________ no change

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper__________
Lower__________ no change

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

① Not a major problem now not likely to be a problem based on
(② If coastal habitat is not protected by providing some sort of buffer then the decline could increase even more)

Are any assumptions different from those we identified under natural recovery?

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)~~[illegible]~~________ -50

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper -10________
Lower -75 to -80

envisioning a 90% confidence interval.

Uncertainty (%) Upper -10
Lower -75%

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)? >20 May forestall decline you may be able to increase # of years

Expected time to recovery (yrs) ~~[illegible]~~

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the actual recovery time required will fall outside of this range.

Uncertainty (yrs) Upper ∞
Lower 10

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Management to minimize disturbance, increases in pollen or minimizing impacts of commercial activity.

Are any assumptions different from those we identified under natural recovery?

If commercial fishing was severely restricted, it may further forestall the decline but it will still decline

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your single best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)__________________

If the problem w/ forage fish could be fixed, then habitat limitation becomes more important.

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper___________
Lower___________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels? NO

Expected value (%)________ Uncertainty (%) _______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Expert's Name: Kathy Kuletz **Date:** December 8, 1992

PART A - Natural Recovery

		unoiled	oiled	
Injured resource: Marbled Murrelets	72-	158,000	119,000	summer
Pre-spill population estimates for PWS (un-oiled)	89-91-	60,000	39,000	
Post-spill population estimates for PWS (oiled)	72/73	20,000	25,000	winter
	90,91	16,500	8,200	

Degree of recovery without intervention:

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent) 80,000

Uncertainty (%) Upper: 100,000
Lower: 50,000

guess

Recovery time needed without intervention:

Expected time to recovery (yrs) 20

Uncertainty (yrs) Upper: 50
Lower: 10

pre-spill likely to be around 15-20,000 7 than post spill

Assumptions?

Habitat: ① Nesting hab may not be limited but add'l logging may limit habitat, huge areas in

Disturbance: ② Increased boating activity in the sound in the next 20 years - stays same at 92 levels

③ Continued decline / problem in forage fish

Harvest (mortality): ④ low level polln may be important

④ Habitat ⑤ Gillnets not likely a significant problem could be exacerbated if incidental take ↑ past 1%.

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

⑥ Kittlitz's

Had the Exxon Valdez Oil Spill not occurred, where would you expect the population to be in ___ years?

Expected status (% of pre-spill) There would have probably ~~been~~ a continuing decline but not as great

breeders adult were most hit

Gillnets could cause localized problems

* Too many long-term problems
o forage fish
contaminations
all these are long-term problems

PART B

Option (suboption) under consideration Incidental Take

Degree of recovery with implementation of this option:

80% Expected recovery (%) 80,000 Not ~~likely to be~~ measureably different Major trends unlikely to be changed

Uncertainty (%) 80-100 Upper

50-80 Lower 1% / year ← increased over long-term 750,000

recovery may be increased by 1% per year

Estimated recovery time with implementation of this option:

Expected time to recovery (yrs) ________

Uncertainty (yrs) Upper ________ Same as N.R.
Lower ________

Assumptions? (Are there assumptions such as the level of implementation, or number of projects that influence this estimate?)

This is assuming that the take is between 1/2% and 1%.

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? Kachemak + Kodiak may have more setnetters. The level of incidental may be variable due to different fishing strategies

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so,...

Estimated negative impact (%) if option is not implemented:

Uncertainty (%) Upper: ________
Lower: ________

Assumptions:

Important to measure that better enforcement is needed

Some confounding issues in other areas may not be factors

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how?

PART E - Enhancement potential

Do you think that this option could be used to bring the population above pre-spill levels? NO

Expected value (%)________

Uncertainty (%) Upper ________
Lower ________

Assumptions?

Summary for Parts B - E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper:__________
Lower:__________

Assumptions:

Katy Kuletz - Marrus

PART B

Option (suboption) under consideration Land Acquisition

Degree of recovery with implementation of this option:

Expected recovery (%) 50

Uncertainty (%) Upper 80
Lower 50

Estimated recovery time with implementation of this option:

Expected time to recovery (yrs) <20 years

Uncertainty (yrs) Upper 50 same
Lower 10

Assumptions? (Are there assumptions such as the level of implementation, or number of projects that influence this estimate?)

(1) Nesting habitat not limited now but could be if all land were logged
(2) Increased harvest likely to adversely impact [illegible]

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? South Kenai, Kodiak, Afognak → impact might be even more severe. Nesting hab may be more limiting

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No) → not currently

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so,...
Yes - As logging continues

Estimated negative impact (%) if option is not implemented:

Uncertainty (%) Upper: ___________
Lower: ___________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how?

PART E - Enhancement potential

Do you think that this option could be used to bring the population above pre-spill levels? NO

Expected value (%)________

Uncertainty (%) Upper ________
Lower ________

would keep the pop'n from ever reaching pre-spill levels

Assumptions?

Summary for Parts B - E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper:__________
Lower:__________

Assumptions:

Kathy Kuletz

PART B

Option (suboption) under consideration Special Designations

Degree of recovery with implementation of this option:

Expected recovery (%) 100 (to 100K)

Uncertainty (%) Upper 100
Lower 80

Estimated recovery time with implementation of this option:

Expected time to recovery (yrs)________ more immediate than impact D's in logging or comm fish

Uncertainty (yrs) Upper__________
Lower__________

Assumptions? (Are there assumptions such as the level of implementation, or number of projects that influence this estimate?)

- Set aside PWS from certain parts of devel, intensive rec development, no marinas, other major disturbances to the overall population, pollution control
- Marine coastal based - If these actions can increase forage fish. to change prey base + protection of predation area

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how?

Same - must be broad target areas that imp forage
ie Kachemak Bay

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

~~If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so,...~~

~~Estimated negative impact (%) if option is not implemented:~~

~~Uncertainty (%) Upper:__________~~
~~Lower:__________~~

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how?

PART E - Enhancement potential

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________

Uncertainty (%) Upper ________
Lower ________

not above 300k
may increase over 100,000

Assumptions?

Summary for Parts B - E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years) 0

Uncertainty (yrs) Upper: 10
Lower: 50

Assumptions:

would accelerate recovery - Could increase beyond 100,000

Include Marbled + Kittlitz's murrelets. Kittlitz's are more affected by gillnetting and are more rare than marbled. Less widely distributed local areas are likely more important to Kittlitz's murrelets. Alpine areas around foraging areas may need protection. Sea ice collection, running, timing may be important factors.

Kathy Kuletz

Expert's Name: ~~Bob Jarvis~~ **Date: December 15, 1992**

PART A - Natural Recovery

Marbled Murrelets

Injured resource: ~~Harlequin Ducks~~

	July 1972	July 89-91	March 72-73	March 90-91
Pre-spill population estimates for PWS (un-oiled)	158,000	60,000	20,300	16,50[illegible]
Post-spill population estimates for PWS (oiled)	119,000	39,000	25,000	8,20[illegible]

Unit of Measure = Pre Spill (72 data)

Degree of recovery without intervention:

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

20 yrs. **Expected recovery (percent)** 80,000 Expect to decline slightly but not catastrophically

Uncertainty (%) **Upper:** ~100,000 (PWS)
Lower: 50,000

Recovery time needed without intervention:

Expected time to recovery (yrs) 20 years; 10 yrs

Uncertainty (yrs) **Upper:** 50
Lower: 10

Assumptions? ~~Beset~~ Taking into acct low level of logging in the sound.

Habitat: at this pt nesting habitat not ltd, but logging ~~cout~~ would be detrimental & could be ltd in future (can to good nesting area & left with waste, etc.) Prob not sig problem

Disturbance: Low level of gillnet take & boat activity Same as at '72 levels. [could ...]

Harvest (mortality): ~~Whatever it was~~

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty? See above. ~~Extra~~ Currently take NOT likely aff pop, but if pop ↓ then take more of a prob. In local areas - can have sig affect (trapped oiled or avoid)

low level pollut'n, could be a problem.

Had the Exxon Valdez Oil Spill not occurred, where would you expect the population to be in ___ years? was decline & given an extra jump by EVO. 15,820 - killed for entire spill area (very cons. est).

Expected status (% of pre-spill) __________

PART B

Incidental Mortality

Option (suboption) under consideration Minimize ^ fm Comm ~~Xt~~

Degree of recovery with implementation of this option:

Expected recovery (%) 89,000 Not pick up in Maj trends — Not ~~tread~~ likely to be ~~treas~~ def over 20 yrs

Uncertainty (%) Upper ~100,000
Lower ↑ >250,000 - 89,000 Recovery ↑ by 1%/yr.

Over term Mortality (50 yrs) — ↑ Raise lower Hd — % over long-term can make diff.

→ Assume take = .5-1%.

Estimated recovery time with implementation of this option:

Expected time to recovery (yrs)________

Uncertainty (yrs) Upper________
Lower________

Same as Nat Recovery

Assumptions? (Are there assumptions such as the level of implementation, or number of projects that influence this estimate?)

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how?

More set-net activity in Kodiak & Kachemak
~~10~~ Not investigated had don't know incidental take.

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so,...

Estimated negative impact (%) if option is not implemented:

Uncertainty (%) Upper:________
Lower:________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how?

PART E - Enhancement potential

Do you think that this option could be used to bring the population above pre-spill levels? NO.

Expected value (%)________

Uncertainty (%) Upper ________
Lower ________

Assumptions?

Summary for Parts B - E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper:__________
Lower:__________

Assumptions:

PART B

Option (suboption) under consideration #37 - Hab Acq.

Degree of recovery with implementation of this option: If don't buy land: 50

Expected recovery (%)________

Uncertainty (%) Upper________ 80,000
Lower________ 50,000

Estimated recovery time with implementation of this option:

Expected time to recovery (yrs)________

Uncertainty (yrs) Upper________
Lower________

Same (could peak sooner)

Assumptions? (Are there assumptions such as the level of implementation, or number of projects that influence this estimate?)

1 There may be some High ~~[illegible]~~ Vol/High Stand Class area that aren't good for Mamu.

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? Areas of S Kenai, or Afognak might be even more severe. (Cause nesting hab or foraging but is more ltd).

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No) But could be high quality being lost. Could be ltd in ~~[illegible]~~ future

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so,...

Estimated negative impact (%) if option is not implemented:

Uncertainty (%) Upper:________
Lower:________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how?

PART E - Enhancement potential

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________

Uncertainty (%) Upper ________ NO

Lower ________

Assumptions? could keep from reaching pre-spill levels.

Summary for Parts B - E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper:__________
Lower:__________

Assumptions:

This one in some fashion ~~need~~ of prey base (forage quest'n). ~~need~~ + fed stoppe, marine, Can't deal on bay-by-bay basis.

PART B

Option (suboption) under consideration Sp Des

Degree of recovery with implementation of this option:

Expected recovery (%) 100,000

Uncertainty (%) Upper 100,000
Lower 80,000

Estimated recovery time with implementation of this option:

Expected time to recovery (yrs) 0 ~~10-20~~

Uncertainty (yrs) Upper 10
Lower 50

same.

Assumptions? (Are there assumptions such as the level of implementation, or number of projects that influence this estimate?)

(1) See. Above. Very Gen brood-base. Can Restrict Dept activities, ~~[illegible]~~ Monitor & Reg pollut'n ctrol.

(2) If these act'n ~~[illegible]~~ forage fish or allow them in certain bays, then ~~[illegible]~~ have pos affect on Murrelets.

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how?

(3) More immed impact than As in logging or Comm. ~~[illegible]~~

With same assumpt, (large area) = Yes (same)
Kat ~~[illegible]~~

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so,...

Estimated negative impact (%) if option is not implemented:

Uncertainty (%) Upper: __________
Lower: __________

Assumptions:

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further? Yes. Combinat'n is better than any alone.

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years) 0 ≥100

Uncertainty (yrs) Upper: 10 Upper ____
Lower: 50 Lower ____

Assumptions:

Frag ~~D~~ could be beyond this. to >100,000.

Impt to incl both Murrelet Species.

Kittlets are > affected by Comm. D than Marmer.

Rare, endemic to AK

Not as widely dist than are Marmer.

Unakwik Inlet is very imp to Kittlets.

Att'n paid to Alpine Areas (0° mining, & mining of Sea Ice). This may be a timing thing.

If ~~the~~ Heavy ↓ Dept ~~to~~ → Pd Dogs, Ravens, etc

then ~~B~~ rec could ~~P~~ predat'n.

Expert's Name: Stan Senner **Date:** November 24, 1992

PART A

Injured resource Marbled Murrelet

Pre-spill population estimates for PWS 300,000 (1972)
(un-oiled)

Post-spill population estimates for PWS 100,000
(oiled)

morgue counts - need to have with me for info.

Without intervention, to what percent of the pre-spill population estimate (or un-oiled estimate) will the population recover? Please provide a single estimate and then try to quantify your uncertainty by providing a range in percentages such that no more than 10 % of the actual degree of recovery falls outside of that range. (essentially, we are asking you to construct a 90% confidence interval)

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent) 0 stabilize Uncertainty (%) -25 to +25
- worse
- best

Without intervention, how many years will it take for the population to recover to the degree identified above? (If the degree of recovery described above is negative, this estimate will represent the amount of time for the population to decline.) Again, please provide single estimate in years, and envision a 90% confidence interval.

Expected time to recovery (yrs) 25 Uncertainty (yrs) 15-35

Assumptions?

Habitat: still have forage fish; nesting habitat not limiting and no further loss of nesting habitat in the absence of implementation of any option

Disturbance: probably not a problem

Harvest (mortality): incidental take accounts for a few percentages of decline

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Higher value - worst case scenario represents the time to stabilization, ultimate worst case is continued decline with no upper bound in years

Had the Exxon Valdez Oil Spill not occurred, where would you expect the population to be in ________ years (the number of years provided above as the expected recovery time)? Note: This question does not always seem to apply.

Expected status (% of pre-spill) diminished rate of decrease

PART B

Option (suboption) under consideration minimizing incidental

Based on your scientific understanding, please provide a single, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 0% = stabilization

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) -15 to +25

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 20

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the actual recovery time required will fall outside of this range.

Uncertainty (yrs) 10-35

Assumptions? (Are there assumptions such as the level of implementation, or number of projects that influence this estimate?)

Assuming geographic correspondence between bird concentration and fishing

Are any assumptions different from those we identified under natural recovery?

Fishing is not randomly distributed so impacts vary between areas

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how?

No. The more localized the distribution outside of PWS, the importance could be increased

PART B

Option (suboption) under consideration habitat degradation

Based on your scientific understanding, please provide a single, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 0

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) -10 to +25

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 20

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the actual recovery time required will fall outside of this range.

Uncertainty (yrs) 15-35

Assumptions? (Are there assumptions such as the level of implementation, or number of projects that influence this estimate?)

No loss of high quality nesting habitat
(Also there is no high quality habitat not in use)

Are any assumptions different from those we identified under natural recovery?

chainsaws stopped tomorrow

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No) in use but not at carrying cap

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your single best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%) continued decline to low level

Please try to quantify your uncertainty such that there is only a 10% chance that the actual impact will fall outside of this range.

Uncertainty (%)__________

Assumptions:

Assume that cutting occurs in one decade then 1 to 1 correspondence in decrease in population

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how?

same as for incidental

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)_______ Uncertainty (%) __________

Assumptions?

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

Solely with this option; 2 or 3 out of 10

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______ Uncertainty (%)__________

Assumptions...

Fry-1

Expert's Name: Mike Fry **Date:** 12/3/92

PART A

Injured resource Marbled murrelet

Pre-spill population estimates for PWS ~ 300,000 — 1972
(un-oiled) ~ 120,000

Post-spill population estimates for PWS 84,000 - 104,000
(oiled)

[Metric used =]

Without intervention, to what percent of the pre-spill population estimate (or un-oiled estimate) will the population recover? Please provide a **single** estimate and then try to quantify your uncertainty by providing a range in percentages such that no more than 10 % of the **actual** degree of recovery falls outside of that range. (essentially, we are asking you to construct a 90% confidence interval)

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent) -5

Uncertainty (%) Upper 0
Lower -100

Without intervention, how many years will it take for the population to recover to the degree identified above? (If the degree of recovery described above is negative, this estimate will represent the amount of time for the population to decline.) Again, please provide single estimate in years, and envision a 90% confidence interval.

Expected time to recovery (yrs) 10 years

Uncertainty (yrs) Upper 8 **
Lower 20

Assumptions?

Habitat: (1)

~~Disturbance~~: (2)

Fry. 2

Harvest (mortality): mortality due

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

No. Uncertainty

Had the Exxon Valdez Oil Spill not occurred, where would you expect the population to be in ________ years (the number of years provided above as the expected recovery time)?

Expected status (% of pre-spill) – %

May increase rate of decline

5

**Uncertainty

PART B

Option (suboption) under consideration______________________

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper____(______
Lower__- 75______

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper___12______
Lower___50______

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

No

Fry - 4
mamu

PART C Not applicable for minimizing incidental take option

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper__________
Lower__________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

Don't know [illegible] trend outside [illegible]. If the population is currently stable or [illegible] this option [illegible] populations. It is unlikely that the population trends are as severe outside PWS.

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ____________

Assumptions?

Fry-5
memo

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the **proposed** restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

Probability of helping to [illegible] [illegible] in 10 [illegible]
population [illegible] this option

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

PART B

Option (suboption) under consideration_______________

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) ~50

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 0
Lower -100

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)_______

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 7
Lower_______

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

Fry - 7
MAMU

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No) or Unknown Likely not currently due to precipitous decline over the last 20 years
If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your single best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%) 50
[illegible] logging [illegible] 50% of the total PWS habitat of MM

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper 0
Lower -100

Assumptions: We don't really know what constitutes MAMU habitat so this makes this very uncertain

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound}

Habitat loss
May be more critical in the Afognak area if logging is greater there. [illegible] of logging outside PWS. Ground nesting mamus are a confounding factor to understanding this.

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

Fig - 8
Manu

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

"Chance of benefitting pop[ulati]on by implementing this option"
5 in 10

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further? Yes! Increases chance of success, 8 or 9 in 10

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

FY-9

PART B

Option (suboption) under consideration________________

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper________
Lower________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 5
Lower 25

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

Fry-10
Mamu

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)__________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper___________
Lower___________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

Hatchery Salmon interactions w/ forage fish outside the sound will probably less intense. Therefore the effects of such an action may be less beneficial outside the sound. Greater chance in ↑ # of birds in localized areas. Could ↑ 50% in 15 years, locally.

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

Fry - 11
mamu

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

3 in 10

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further? If we eliminate direct mortality, protect habitat ± new special designations we may have [illegible] -50 [illegible] 20 years (reduce rate of decrease but [illegible] degree)

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?) - 50 Δ

Expected value (years) 20

Uncertainty (yrs) Upper 15
Lower 30

Assumptions...

Forage Fish Problem:
- Restore [illegible] [illegible] in [illegible] [illegible], [illegible] be [illegible] [illegible] PWS [illegible] [illegible] [illegible] [illegible] Recover [illegible] [illegible] in PWS to KBO areas

Expert's Name: Michael Fry **Date:** 3 Dec '92

PART A

Injured resource Marbled Murrelet

Pre-spill population estimates for PWS ~300,000 (1972)
(un-oiled) 120,000 1988 estimate

Post-spill population estimates for PWS 89,000 - 104,000 (1991)
(oiled)

[Metric used =]

Without intervention, to what percent of the pre-spill population estimate (or un-oiled estimate) will the population recover? Please provide a **single** estimate and then try to quantify your uncertainty by providing a range in percentages such that no more than 10 % of the **actual** degree of recovery falls outside of that range. (essentially, we are asking you to construct a 90% confidence interval)

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent) -50

Uncertainty (%) Upper 0 stable
Lower -100%

Without intervention, how many years will it take for the population to recover to the degree identified above? (If the degree of recovery described above is negative, this estimate will represent the amount of time for the population to decline.) Again, please provide single estimate in years, and envision a 90% confidence interval.

Expected time to ~~recovery~~ 50% decline (yrs) 10

Uncertainty (yrs) Upper 8
Lower 20

Assumptions?

Habitat: salmon landings increased 10 fold since 1980 so competition with forage fish (not expecting increases to continue)
old growth logging around PWS will increase.

Disturbance: minor

Harvest (mortality): Gill net losses maintained at couple thousand/yr.

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Too few population points to make project

Had the Exxon Valdez Oil Spill not occurred, where would you expect the population to be in ________ years (the number of years provided above as the expected recovery time)?

Expected status (% of pre-spill) ~50%

15 years to reach ~50%

Salmon

PART B

Option (suboption) under **consideration** minimizing incidental catch

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) ~50%

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper ~0
Lower -75

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 25

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 12
Lower 50

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Targeting concentration areas may eliminate 80% of mortality at a 10% cost to Fishing

Are any assumptions different from those we identified under natural recovery?

1) Geographical dist^2 & distance from shore of Foraging murrelets
2) [illegible] Fish[illegible] grounds

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)__________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper___________
Lower___________

Assumptions:

* Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)
Would be as beneficial outside of PWS, but doesn't believe that the murrelet

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) _______________

Assumptions?

Summary for Parts B-E:

reword!

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

7 out of 10 chance of benefitting the population

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

PART B

Option (suboption) under **consideration** land acquisition

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) -50

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

population decline

Uncertainty (%) Upper 0
Lower -100

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 15

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 8
Lower -30

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

50% of potential habitat protection

Are any assumptions different from those we identified under natural recovery?

50% of the marbled murrelet nesting habitat is on selected lands (based on hemlock)

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)__________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper___________
Lower___________

Assumptions: less intense salmon hatchery interaction

* Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)
More beneficial - could change hypothetical decrease from 15yrs in

Could potentially increase locally.

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) _______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

3 out of 10.

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years) -50%, 20 yrs

Uncertainty (yrs) Upper 15
Lower 30

Assumptions...

Forage fish problem: restore salmon catch to 1980 level
we could increase the pop from 100,00 to 200,000
(population of salmon reduced)

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

50:50 (only option done)
80 or 90% if other options applied.

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

PART B

Option (suboption) under consideration Special designations

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) -50

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 0
Lower -80%

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 15

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 8
Lower 25

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

50% of nesting land in public lands

Are any assumptions different from those we identified under natural recovery?

Designation of marine areas - closure areas of herring provide extra forage of herring roe for murrelets.

-remote release of salmon prohibited

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No) Unknown, but it is unlikely to be limiting right now because of

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate) loss of 50%

Estimated negative impact (%) -50

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper 0 Too many unknowns.
Lower -100%

Assumptions: if other mortality worked on but ½ nesting is lost then the population would be confined to 50,000

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

~~[illegible]~~ may be more critical on Afognak.
remember that nesting can occur without trees.

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

Expert's Name: John Ford **Date:** 10 Dec '92

PART A - Natural Recovery

Injured resource Killer whales Resident Pods

Pre-spill population estimates for PWS (un-oiled) AB 35 (1984)
36 (1986)

Post-spill population estimates for PWS (oiled) 24 (1991) believe 8 were lost naturally or s

It is the only resident pod that has declined in PWS

Degree of recovery without intervention:

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent) 100

Uncertainty (%) Upper: ______
Lower: ______

Recovery time needed without intervention:

Expected time to recovery (yrs) ~~[illegible]~~ ~~(not needed)~~

Uncertainty (yrs) Upper: 20
Lower: 10

Assumptions?

Habitat: Assuming no major change in social structure
Population has not reached carrying capacity

Disturbance: no more shooting by fisherman.

Harvest (mortality):

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Had the Exxon Valdez Oil Spill not occurred, where would you expect the population to be in ___ years?

Expected status (% of pre-spill) 39 or 40

maximum rate is 1 calf / 3 yrs with survival = 1 calf / 6 yrs.

PART B

Option (suboption) under consideration reduce disturbance + special designation

Based on your scientific understanding, please provide a single, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper____________
Lower____________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)__________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the actual recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 20
Lower 10

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

No evidence that disturbance by boat traffic affects reproductive rates.
"sited evidence from BC where growth = 2-3%/yrs in spite of magnitude increase in boat traffic

Are any assumptions different from those we identified under natural recovery?

-Pots for black cod (no killer whale interaction; only way fishery is done in BC)

PART B

- Education

Option (suboption) under consideration Enforcement of MMPA during black cod fishery

Degree of recovery with implementation of this option:

Expected recovery (%)________ at least 6 of the 8 missing animals should have been from shooting

Uncertainty (%) Upper__________
Lower__________

1.8% mortality/yr is natural

Estimated recovery time with implementation of this option:

Expected time to recovery (yrs)________

Uncertainty (yrs) Upper__________
Lower__________

Assumptions? (Are there assumptions such as the level of implementation, or number of projects that influence this estimate?)

AN pod may also be vulnerable

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so,...

Estimated negative impact (%) if option is not implemented:

Uncertainty (%) Upper:__________
Lower:__________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how?

PART B

Option (suboption) under consideration________________________

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper___________
Lower___________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)_________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper___________
Lower___________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your single best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)____________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the actual impact will fall outside of this range.

Uncertainty (%) Upper____________
Lower____________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ________________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

Expert's Name: Evelyn Biggs **Date:** 12-10-92

PART A

Injured resource ~~Cutthroat Trout~~ Herring

Pre-spill population estimates for PWS (un-oiled) ____________________

Post-spill population estimates for PWS (oiled) ____________________

[Metric used =]

Without intervention, to what percent of the pre-spill population estimate (or un-oiled estimate) will the population recover? Please provide a **single** estimate and then try to quantify your uncertainty by providing a range in percentages such that no more than 10 % of the **actual** degree of recovery falls outside of that range. (essentially, we are asking you to construct a 90% confidence interval)

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

* 1988 yr class damage

Expected recovery (percent) -25%

potential ~~[illegible]~~ reproductive product of 1988 yr class which drives population so this could represent the -25% population effect.

Uncertainty (%) Upper 100
Lower 0

Without intervention, how many years will it take for the population to recover to the degree identified above? (If the degree of recovery described above is negative, this estimate will represent the amount of time for the population to decline.) Again, please provide single estimate in years, and envision a 90% confidence interval.

Expected time to recovery (yrs) 8

Uncertainty (yrs) Upper ∞ who knows.
Lower ______

Assumptions?

Habitat: No change

Disturbance:

* - 1988 Assume damage and reproductive capability is reduced 50%

- 1989 year class falls in the middle of the production. Believes that 5% of population was affected.

Harvest (mortality):

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Had the Exxon Valdez Oil Spill **not** occurred, where would you expect the population to be in ________ years (the number of years provided above as the expected recovery time)?

Expected status (% of pre-spill) equal hatching rates

C

PART B

Option (suboption) under consideration Increase Fisheries Management

Based on your scientific understanding, please provide a single, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) ~12%   Assuming there was a 50% of populational

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper__________
Lower__________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)__________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the actual recovery time required will fall outside of this range.

Uncertainty (yrs) Upper__________
Lower__________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

Increased precision
stock assessment improved → will allow for fine tuned harvest
→ need detailed population info. (how much of pop is damaged)
so you can counter injury by reducing harvest rates.

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your single best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)___________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the actual impact will fall outside of this range.

Uncertainty (%) Upper___________
Lower___________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ________________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

scratch this.

PART B

Option (suboption) under consideration supplemental substrates.

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper___________
Lower___________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)_________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the actual recovery time required will fall outside of this range.

Uncertainty (yrs) Upper___________
Lower___________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Herring do not "home" to spec. the sites so we will not be able to measure benefits except in terms of hatch to free swimming larvae. Spawning substrates are not limiting

Are any assumptions different from those we identified under natural recovery?

(70% of eggs laid subtidally) Evelyn does not believe that any of the kelp in spawning areas were injured.

85% survival versus 5% survival on best substrates, Technical feasibility is low, because

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your single best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)_________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the actual impact will fall outside of this range.

Uncertainty (%) Upper__________
Lower__________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

PART B

Option (suboption) under consideration Special designations

Based on your scientific understanding, please provide a single, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper___________
Lower___________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)_________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the actual recovery time required will fall outside of this range.

Uncertainty (yrs) Upper___________
Lower___________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Prevent upland development, reduce boat traffic

Are any assumptions different from those we identified under natural recovery?

On a scale of 1:10

Evelyn Biggs - Herring

poor survival — medium to normal

1) 1989 embryo → Free swimming larvae — oiled vs unoiled

2) juvenile trawl survey

3) adult damage

- 1989 year class hit hard as embryo — 40% of spawning
- " have not ~~sampled ju~~ analyzed juvenile data yet except distribution but it has shown 90% of rearing habitat overlapped with the oil distribution
- Adults fish in oiled area shown histopathalagical scarring have also : looked at parasites which burrowed deeper into the flesh of the fish. Showed that toxic encounter~~s~~ had occur.
  "Think that in 1989 a large portion of adult population was oiled (the 1983 year class)"

→ Reproductive capability - in 1989 measured the dominating spawning class (1984 year class). Oiled fish the hatching success was ½ the normal. 1988 year class.

1992 ← measured 1988 year class

the ~~assum~~ hypothesis is that the 1 year old fish were feeding on oiled areas.

Expert's Name: Sam Patton **Date:** 12/16/92

PART A

Injured resource Harlequin Ducks

early 70s (judgemental) see note on reverse

Pre-spill population estimates for PWS (un-oiled) 6,000 in PWS summer 10,— win

Post-spill population estimates for PWS (oiled) 5,— PWS ('91)

[Metric used = Pre-post spill pops]

Yes, pop. declin... Post-spill... Low... No broods... Only 1 in oil spill area.

Without intervention, to what percent of the pre-spill population estimate (or un-oiled estimate) will the population recover? Please provide a **single** estimate and then try to quantify your uncertainty by providing a range in percentages such that no more than 10 % of the **actual** degree of recovery falls outside of that range. (essentially, we are asking you to construct a 90% confidence interval)

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

broods in oth... area. Few brood observ. Not leading

Expected recovery (percent) 100%

Little ... H.D. ... w/in spill area ... Some on ...

Uncertainty (%) Upper 100% Lower 70%

Without intervention, how many years will it take for the population to recover to the degree identified above? (If the degree of recovery described above is negative, this estimate will represent the amount of time for the population to decline.) Again, please provide single estimate in years, and envision a 90% confidence interval.

100% 20 yrs

Expected time to recovery (yrs) 70% 10 yrs

Uncertainty (yrs) Upper 10 Lower 30

Assumptions?

Habitat: They are ... mussels ... They ... Mussels. The 10 ... mussel beds. ... No ... in logging. Slightly concerned about ...

Disturbance:

No breeding w/in oil spill area, ... '92.
(Some on ...)

HC: ~~... enough to ... feeding ...~~
See HC ...

Assume No L-T other decline.

Harvest (mortality): Same as current. Harvest not substantial pre-spill. (Not repro, if kill a/o Now Closed in summer. Winter OK 'cause it's [illegible]

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Had the Exxon Valdez Oil Spill **not** occurred, where would you expect the population to be in ~~[illegible]~~ 20 years (the number of years provided above as the expected recovery time)?

Expected status (% of pre-spill) ~~[illegible]~~ 100% (Same as pre-spill,

Remaining Spill Area

Similar.

PART B

Option (suboption) under consideration Temp Rebuild

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)______

NC

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper______
Lower______

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 30

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 40
Lower 20

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%) ________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper__________
Lower__________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound}

Similar to Remaining Spill Area.
Probably Patchy Depend Fuelure.

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ____________

Assumptions? Not Really.

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

Sam Patton
Harl Ducks

PART B

Option (suboption) under consideration 13. Elim Oil from ~~Mussel Beds~~

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper___________
Lower___________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 10

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper ~~8~~ 20
Lower ~~4~~ 10

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

If get most of HC out of Env, If opt'n applied on broad scale, then effect on pop'l ex.

Are any assumptions different from those we identified under natural recovery?

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper__________
Lower__________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound}

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

NO

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)__________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper___________
Lower___________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound}

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) _______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

Sam ~~Patter~~
Hal Ducks.

PART B

Option (suboption) under **consideration** Special Designations

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper___________
Lower___________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)_________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper___________
Lower___________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

~~The existing restriction~~ on ~~harvest is lifted~~

Are any assumptions different from those we identified under natural recovery?

Not as now

Assist, ~~but not~~ helps but not
measurable P.

PART C

Do you believe that the habitat which ~~is~~ protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%) 80 %

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper 90%
Lower 70%

Assumptions: ~~↑ Non consumptive~~ ↑'d activity. They are sens to disturbance. (Relying on exp & studies in Or & Wash)

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

No

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years) 10

Uncertainty (yrs) Upper 15
Lower 10

Assumptions...

if do all 5 at same time.

Sam Patten - - Harl Ducks

PART B

Option (suboption) under consideration Ø Purch Habitat

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________

Same as Nat Recovery - if H.S. logging

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper___________
Lower___________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)_________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper___________
Lower___________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

If all Native Land logged w/in 15 yrs.

Pg 1

Expert's Name: Bob Jarvis **Date:** 12/16/92

PART A

Injured resource Harlequin Ducks

Pre-spill population estimates for PWS (un-oiled) Not compatable with Trust

Post-spill population estimates for PWS (oiled)

PWS continuing to decline
Outside PWS stable to pre-spill

[Metric used = Oiled v Unoiled
÷ into Resident + winter Migrants]

Without intervention, to what percent of the pre-spill population estimate (or un-oiled estimate) will the population recover? Please provide a **single** estimate and then try to quantify your uncertainty by providing a range in percentages such that no more than 10 % of the **actual** degree of recovery falls outside of that range. (essentially, we are asking you to construct a 90% confidence interval)

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent) 100% 50% w/in 50 yrs

Uncertainty (%) Upper ______ If long enough will recover.
Lower ______

Without intervention, how many years will it take for the population to recover to the degree identified above? (If the degree of recovery described above is negative, this estimate will represent the amount of time for the population to decline.) Again, please provide single estimate in years, and envision a 90% confidence interval.

Expected time to recovery (yrs) 50 yrs

Uncertainty (yrs) Upper 100
Lower 25

Assumptions? All ~~things~~ everything ... as is

Habitat: No more Logging

Disturbance: No ... (... spill level)

HC ... eventually degrade ... ecosystem

Harvest (mortality): Harvest stays closed (as now)

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Had the Exxon Valdez Oil Spill **not** occurred, where would you expect the population to be in 50 years (the number of years provided above as the expected recovery time)?

Expected status (% of pre-spill) Stable 100%

Bill Jarvis

Special Special → Designation

PART B

Option (suboption) under consideration Harl Duck

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper___________
Lower___________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)_________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper___________
Lower___________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

Assum. 1) Sp Des. Protect ... stream ... (from fishing, etc) Hatchery Fish were

2) Protect offset ... ~~Hatch~~ fishing but some

~~...~~ ... for future

Also ...

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)__________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper___________
Lower___________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound}

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) _______________

Assumptions? Slight Chance, 1 in 10 or 1-50
of Pings > pre-spill.

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

Bob Jarvis.

PART B

Option (suboption) under consideration Close fleet

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) ________ same

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper__________
Lower__________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)________

~~10-20%~~
[illegible] 2% from [illegible]
[illegible]

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper__________
Lower__________

[illegible] effects.

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery? Should close

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)__________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper___________
Lower___________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) _______________

Assumptions?

NO

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

Bob Jarvis

Flat Ducks.

PART B

Option (suboption) under consideration Vol Harvest

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper____________
Lower____________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)__________ ~~very~~ Little Less

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper____________
Lower____________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)__________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%)   Upper___________
                   Lower___________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________   Uncertainty (%) _______________

Assumptions?

NO

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

Bob Jarvis

Harl Docks = Mussel Beds

PART B

Option (suboption) under consideration Elim Oil fm

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper__________
Lower__________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 30 50% Improvement

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 60
Lower 15

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)__________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper___________
Lower___________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound}

Benefit migrants outside PWS

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) _______________

Assumptions?

NO

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

All 5 opt'ns

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years) 20yrs

Uncertainty (yrs) Upper 40
Lower 15

Assumptions...

Most Imp = get oil out of Mussel beds.

Other:

- Close to winter & summer bd's.
- Combine with et pgm to ens compliance.
-

Kat Jarvis: Harl. Ducks.

PART B

Option (suboption) under consideration Hab. Acq.

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected **recovery** (in percent) with the implementation of this option. I/ logging

Expected recovery (%)________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper__________
Lower__________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 50yrs + 20% = 60yrs

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 120
Lower 30

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

~~Re~~ Stop all logging.

Are any assumptions different from those we identified under natural recovery?

PART C

if ↓ hab ⇒ ↓ pop

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)__________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper___________
Lower___________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

Similar in Afognak, [illegible]

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) _______________

Assumptions?

No

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

Expert's Name: Kathy Frost **Date:** 14 Dec '92

PART A

Injured resource Harbor Seals

Pre-spill population estimates for PWS (un-oiled) Indices 1988 1036 (oiled 419) represent

Post-spill population estimates for PWS (oiled) 1992 778 (oiled 274) 7 out of 25 areas

[Metric used = 25% declined]
includes oiled & unoiled areas

Without intervention, to what percent of the pre-spill population estimate (or un-oiled estimate) will the population recover? Please provide a **single** estimate and then try to quantify your uncertainty by providing a range in percentages such that no more than 10 % of the **actual** degree of recovery falls outside of that range. (essentially, we are asking you to construct a 90% confidence interval)

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent)______

Uncertainty (%) Upper __________
Lower __________

Without intervention, how many years will it take for the population to recover to the degree identified above? (If the degree of recovery described above is negative, this estimate will represent the amount of time for the population to decline.) Again, please provide single estimate in years, and envision a 90% confidence interval.

Expected time to recovery (yrs)________

Uncertainty (yrs) Upper_______
Lower_______

Assumptions?

Habitat:

Disturbance:

Harvest (mortality):

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Had the Exxon Valdez Oil Spill **not** occurred, where would you expect the population to be in ________ years (the number of years provided above as the expected recovery time)?

Expected status (% of pre-spill) ____________

PART B

Option (suboption) under consideration Establish buffer zones

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper___________
Lower___________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)_________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper___________
Lower___________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

All haulout sites should be in a management plan which prohibits any development within ½ mile or mile. Aquaculture, fishing (set nets), logging

Are any assumptions different from those we identified under natural recovery?

Don't know why declining

Expert's Name: Brent Stewart **Date:** 14 Dec '92

PART A

Injured **resource** Harbor Seals

Pre-spill population estimates for PWS (un-oiled) Trend Indices 1988 1036

Post-spill population estimates for PWS (oiled) 1992 778

[Metric used =]

Without intervention, to what percent of the pre-spill population estimate (or un-oiled estimate) will the population recover? Please provide a **single** estimate and then try to quantify your uncertainty by providing a range in percentages such that no more than 10 % of the **actual** degree of recovery falls outside of that range. (essentially, we are asking you to construct a 90% confidence interval)

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent)______

Uncertainty (%) Upper __________
Lower __________

Without intervention, how many years will it take for the population to recover to the degree identified above? (If the degree of recovery described above is negative, this estimate will represent the amount of time for the population to decline.) Again, please provide single estimate in years, and envision a 90% confidence interval.

Expected time to recovery (yrs)________

Uncertainty (yrs) Upper_______
Lower_______

Assumptions?

Habitat: 85% decline from '76 to '88 (continued now)
~~Assuming that he~~

Disturbance:

Determine what foraging areas are important and if the habitat is healthy whether the seals migrate.

Harvest (mortality):

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Had the Exxon Valdez Oil Spill not occurred, where would you expect the population to be in _______ years (the number of years provided above as the expected recovery time)?

Expected status (% of pre-spill) ___________

PART B

Option (suboption) under consideration reduce disturbance

Based on your scientific understanding, please provide a single, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper___________
Lower___________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)_________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the actual recovery time required will fall outside of this range.

Uncertainty (yrs) Upper___________
Lower___________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Could be ~~seasonal~~ seasonal & brief during pupping

10-20 minute separate will ~~be~~ make it likely for the pup to die.

Are any assumptions different from those we identified under natural recovery?

Fairly tolerant except for people on shore so the ♀ & pups are separated

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound}

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) _______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART B

Option (suboption) under consideration Information/Education Subsistence Fishing

Based on your scientific understanding, please provide a single, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper___________
Lower___________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)_________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the actual recovery time required will fall outside of this range.

Uncertainty (yrs) Upper___________
Lower___________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

IF "take" is adults, the reproductive population is reduced and decline continued.

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound}

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) _______________

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

Education programs probably most effective

We can't judge the disturbance value until we know the effects of disturbance or how widely they range.

Expert's Name: Susan Macovon Bob Lafferty **Date:** 11 Dec '92

PART A - Natural Recovery

Injured resource Dolly Varden Trout

Pre-spill population estimates for PWS (un-oiled) ____________

Post-spill population estimates for PWS (oiled) 20-30% lower survival

Degree of recovery without intervention:

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent) 100

Uncertainty (%) Upper: 100
Lower: 80

Recovery time needed without intervention:

Expected time to recovery (yrs) 13

Uncertainty (yrs) Upper: 19
Lower: 9

Assumptions?

Habitat: no change to habitat
good forage.

Disturbance:

Harvest (mortality): 10% harvest

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Had the Exxon Valdez Oil Spill not occurred, where would you expect the population to be in ___ years?

Expected status (% of pre-spill) stable 100%

PART B

Option (suboption) under consideration Increase fisheries management

Based on your scientific understanding, please provide a single, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 100
Lower 85-90

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 8

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the actual recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 12
Lower 6

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

short term predictability

Are any assumptions different from those we identified under natural recovery?

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your single best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the actual impact will fall outside of this range.

Uncertainty (%) Upper__________
Lower__________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%) 10%____ Uncertainty (%) ____________

Assumptions?

Same as for cuts,

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

PART B

Option (suboption) under consideration Update anadromous catalog

Based on your scientific understanding, please provide a single, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 100
Lower ______

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 13

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the actual recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 19
Lower 9

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Assumption - no further habitat degradation

Are any assumptions different from those we identified under natural recovery?

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your single best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the actual impact will fall outside of this range.

Uncertainty (%) Upper__________
Lower__________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

May have more positive benefit where streams are less documented.

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ____________

Assumptions?

No

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

3-4 years from point when conditions become ideal.

PART B

Option (suboption) under consideration protection of private lands.

Based on your scientific understanding, please provide a single, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 100
Lower ________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 13

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the actual recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 19
Lower 9

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Assuming no major impacts or

Are any assumptions different from those we identified under natural recovery?

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your single best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%) 10-20% negative

Please try to quantify your uncertainty such that there is only a 10 percent chance that the actual impact will fall outside of this range.

Uncertainty (%) Upper -1%
Lower -20%

Assumptions:

Assuming

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

Equal importance proportional to amount of logging.

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

PART B

Option (suboption) under consideration Special Designation

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 100
Lower 85-80%

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 15

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 19
Lower 09

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your single best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%)________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the actual impact will fall outside of this range.

Uncertainty (%) Upper__________
Lower__________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

About the same

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

No

Expert's Name: Dan Roby **Date:** 8 Dec '92

PART A - Natural Recovery

Injured resource Common murre

Pre-spill population estimates for ~~PWS~~ Barren Islands 130,000 ~~100,000~~
(un-oiled)

60-[illegible]

Post-spill population estimates for ~~PWS~~ Barren Islands 40-50,000 max
(oiled)

(because of [illegible])

Degree of recovery without intervention:

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent) +100

Uncertainty (%) Upper: 110
Lower: 75

Recovery time needed without intervention:

Expected time to recovery (yrs) 85

Uncertainty (yrs) Upper: 120
Lower: 50

Assumptions?

Habitat: Fishing will not be intensified within foraging distance of the colony. Food supply remains healthy. If [illegible] then "who knows"

Disturbance: No other "chronic" oil spills in area

Harvest (mortality):

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Had the Exxon Valdez Oil Spill **not** occurred, where would you expect the population to be in Now years?

Expected status (% of pre-spill) 130,000

PART B

Option (suboption) under consideration reduce disturbance [illegible]

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 110
Lower [illegible]

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 75

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 120
Lower 50

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

[illegible]

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) _______________

Assumptions?

No

Summary for Parts B-E:

Overall, what do you think is the ~~chance~~ likelihood that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

more rapidly

60-70%

Pauls Bay - vulnerable commercial fishing

Chiswell Islands - to tour boats benefit. Effectiveness would be less here because the [illegible] habitats

PART B

Option (suboption) under consideration Education - reduce disturbance

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 110
Lower 75

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 85

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 120
Lower 50

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Assuming that it would [illegible] voluntary compliance from fishermen,

Are any assumptions different from those we identified under natural recovery?

Chiswell Islands → some measureable benefit in preventing disturbance that may occur when the tour boats change routes or expand to new [illegible] before habituate

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) _______________

Assumptions? NO

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART B

Option (suboption) under consideration *Enhance social stimuli*

Based on your scientific understanding, please provide a **single,** best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) *100*

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper *110*
Lower *75*

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)_________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper_________
Lower_________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

[illegible] *make* [illegible] *recovery* [illegible]

Are any assumptions different from those we identified under natural recovery?

If the technical feasibility is proven effective we could "halve" the uncertainty ([illegible] *)*

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ________________

Assumptions? NO

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART B

Option (suboption) under consideration [illegible]

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 110
Lower 75

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) [illegible]

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 120
Lower 50

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Could be highly effective under the right circumstances (small colonies, accessible). Effectiveness depends largely on level of [illegible],

Are any assumptions different from those we identified under natural recovery?

[illegible] current [illegible] success before [illegible] any techniques [illegible]

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

> Do you think that this option could be used to bring the population above pre-spill levels?
>
> Expected value (%)________ Uncertainty (%) ______________

Assumptions? No - not [illegible] [illegible] [illegible]

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART B

Option (suboption) under consideration [illegible]

Based on your scientific understanding, please provide a **single,** best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 110
Lower 75

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 65 [illegible] → Assuming other factors fall into place.

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 120
Lower 50

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

We [illegible] what [illegible] etc. In [illegible] we [illegible] predation [illegible] 50% of [illegible] loss.

Are any assumptions different from those we identified under natural recovery?

* [illegible]%/year maximum recovery rate, low [illegible] in [illegible], [illegible] synch[illegible]

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) _______________

Assumptions? No

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

Don't know applicability on other islands - related to whatever factors are causing, at egg loss.

PART B

Option (suboption) under consideration Purchase private lands

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 110
Lower 75

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) ________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper ________
Lower ________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Don't perceive obvious [illegible] the [illegible] potential exists because of [illegible] proximity to Homer the threat exists.

Are any assumptions different from those we identified under natural recovery?

[illegible] for securing protection.

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate) No

Estimated negative impact (%)__________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper___________
Lower___________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) _______________

Assumptions?

PART B

Option (suboption) under consideration Special Designation

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%)________

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper___________
Lower___________

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs)_________

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper___________
Lower___________

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Limiting of [illegible], limiting fishing ([illegible])

(There are some [illegible] in [illegible] which may [illegible]

providing [illegible]. These [illegible] areas [illegible]

Are any **assumptions** different from those we identified under natural recovery?

by [illegible] It is also a [illegible]

[illegible]

PART C

Do you believe that the habitat which is protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%) No ________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper__________
Lower__________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?
If so, how? {Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound}

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the **proposed** restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?) 10%/yr

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

Try combination of social stim. w/ reduced predators.

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

Expert's Name: Dan Roby **Date:** 12/8/92

PART A - Natural Recovery

Injured resource Common Murre 130,000

Pre-spill population estimates for ~~PWS~~ Barren Islands 130,000
(un-oiled) 1,121,500 - AM

Post-spill population estimates for ~~PWS~~ Barren Islands 40,000 - 50,000
(oiled)

Degree of recovery without intervention:

(Note: 100% = full recovery to pre-spill baseline levels, <100% means that the population is not expected to naturally return to pre-spill status in the next 50 years. A negative value can be used to represent continuing decline, with -100% = local extinction.)

Expected recovery (percent) +100

Uncertainty (%) Upper: +100
Lower: +75

70 35

Recovery time needed without intervention:

Expected time to recovery (yrs) 85

Uncertainty (yrs) Upper: 120
Lower: 50

130 × .4 = 70 52.0

130 × .6 = 8

Assumptions?

Habitat: No additional oil spills

130 × .3

Disturbance: No intensified comm fishing w/in foraging distance of the colonies. This recovery assumes the food supply doesn't change dramatically

Harvest (mortality):

Are there any differences in the assumptions you are making to arrive at the upper and lower bounds of your level of certainty?

Had the Exxon Valdez Oil Spill ~~not~~ occurred, where would you expect the population to be in ___ years?

Expected status (% of pre-spill) 100%

PART B

Option (suboption) under consideration Reduce disturbance at colonies due to human activities

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 110
Lower 75

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 75 will reduce the recovery time

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 120
Lower 50

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

Although the disturbance isn't major, overall it would be helpful
Puale Bay may be more vulnerable to comm fishing
Chiswells are probably habituated

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels? NO

Expected value (%)________ Uncertainty (%) _______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

60-70%
Certainly won't hurt

PART B

Option (suboption) under consideration Encourage voluntary reduction in disturbance at colonies

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 110
Lower 75

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Difficult to quantify affect on population recovery

Expected time to recovery (yrs) 85

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 120
Lower 50

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

Puale Bay may be more vulnerable to comm fishing and fishermen may be less likely to
Guswells have probably habituated but main benefit would be in preventing incremental disturbance. If there were an increase in tour boat operators, there may be an additional loss of young.

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels? NO

Expected value (%)________ Uncertainty (%) ________________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART B

Option (suboption) under consideration Enhance social stimuli at injured murre colonies

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) 100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 110
Lower 75

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) ______ ← Very uncertain

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 120
Lower 50

Can't see how this could be applied extensively enough on the Barrens to significantly increase recovery rate

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

If the technique works you could lower the uncertainty

Are any assumptions different from those we identified under natural recovery?

This could be ~~more~~ effective in smaller colonies, but the uncertainty is great. It would have to be done on such an extensive scale.

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels? NO

Expected value (%)________ Uncertainty (%) _______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART B

Option (suboption) under consideration Improve physical characteristic of nest sites

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) +100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper 110
Lower 75

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 85 Unlikely to significantly enhance recovery rates

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 120
Lower 50

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

Could be effective under the right circumstances, largely dependent on level of predation.
Need to increase on colony work to figure out factors which are limiting recovery.

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels? NO

Expected value (%)________ Uncertainty (%) ________________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART B

Option (suboption) under consideration Reduce predator access to seabird colonies

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) +100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper +110
Lower +75

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 65-70 Assuming that syncrony would take over. Possibility that it would enhance it even more.

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 120
Lower 50

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

- We don't know what predation levels are applicable.
- In some colonies, gull predation could take up to 50%
- Maximum recovery rate 10%/year assuming low predators, abundant food, non-limiting habitat.

PART E
If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels? NO

Expected value (%)________ Uncertainty (%) _______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART B

Option (suboption) under consideration Purchase private lands

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) +100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper +110
Lower ~~+75~~

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 85 Unlikely to affect recovery rate or degree

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 120
Lower 50

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

Gull Rock - worthwhile path to take for Gull Rock, altho no obvious threats are perceived to Gull Rock. However, considering proximity to Homer, public exposure it should be in public ownership. However, there would not likely be a tangible recovery benefit.

PART C

Do you believe that the habitat which ~~is~~ protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

Estimated negative impact (%) no ________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper__________
Lower__________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

PART E

If the rate or degree of recovery can be benefited by implementing the above option: no

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the <u>chance</u> that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

PART B

Option (suboption) under consideration Special Designations

Based on your scientific understanding, please provide a **single**, best-judgement estimate of the expected recovery (in percent) with the implementation of this option.

Expected recovery (%) +100

Acknowledging that there is uncertainty in this assessment of expected recovery, please try to quantify this uncertainty by envisioning a 90% confidence interval.

Uncertainty (%) Upper +110
Lower + 75

With implementation of this option, in your best judgement, how many years would you estimate the time required to reach pre-spill population levels (or un-oiled)?

Expected time to recovery (yrs) 85

Please try to quantify the your uncertainty by providing a range in years such that there is only a 10% chance that the **actual** recovery time required will fall outside of this range.

Uncertainty (yrs) Upper 120
Lower 50

Assumptions? (Are there assumptions such as the level of implementation, duration or number of projects that influence this estimate?)

Are any assumptions different from those we identified under natural recovery?

Unless we are talking about oil exploration or development adjacent to breeding areas. Need to better understand the effects of oil development on U Cook Inlet colonies(?) (~~Chisik Island~~) (Duck Island)

PART C

Do you believe that the habitat which ~~is~~ protected by this option is limiting for the resource? (Yes or No)

If the habitats are not currently limiting, could you imagine a realistic scenario where they may become limiting? If so, please provide your **single** best-judgement estimate (in percent) of the potential impact on the resource if this option is not implemented. (Consider the assumptions used to estimate the natural recovery rate)

NO

Estimated negative impact (%)________________

Please try to quantify your uncertainty such that there is only a 10 percent chance that the **actual** impact will fall outside of this range.

Uncertainty (%) Upper__________
Lower__________

Assumptions:

Is there reason to expect the effects of this option to be different outside of Prince William Sound?

If so, how? (Note: repeat Part B for other areas if necessary. Divisions = Kenai/Cook Inlet; Kodiak/Alaska Peninsula and/or Prince William Sound)

PART E

If the rate or degree of recovery can be benefited by implementing the above option:

Do you think that this option could be used to bring the population above pre-spill levels?

Expected value (%)________ Uncertainty (%) ______________

Assumptions?

Summary for Parts B-E:

Overall, what do you think is the chance that pre-spill population levels will be reached or exceeded as a consequence of the proposed restoration option. (e.g. 1 in 10?, 8 in 10?, 99 in 100? ...)

PART F (To be completed after parts A-E have been addressed for all relevant restoration options)

Can this option be combined with another option(s) to accelerate the rate or degree of recovery even further?

What is the maximum potential rate of recovery? (or.. What is the minimum # of years to recovery?)

Expected value (years)______

Uncertainty (yrs) Upper__________
Lower__________

Assumptions...

- Enhance social stimuli, reduction of predator losses