

## Tables and Figures for Groundfish Research Plan

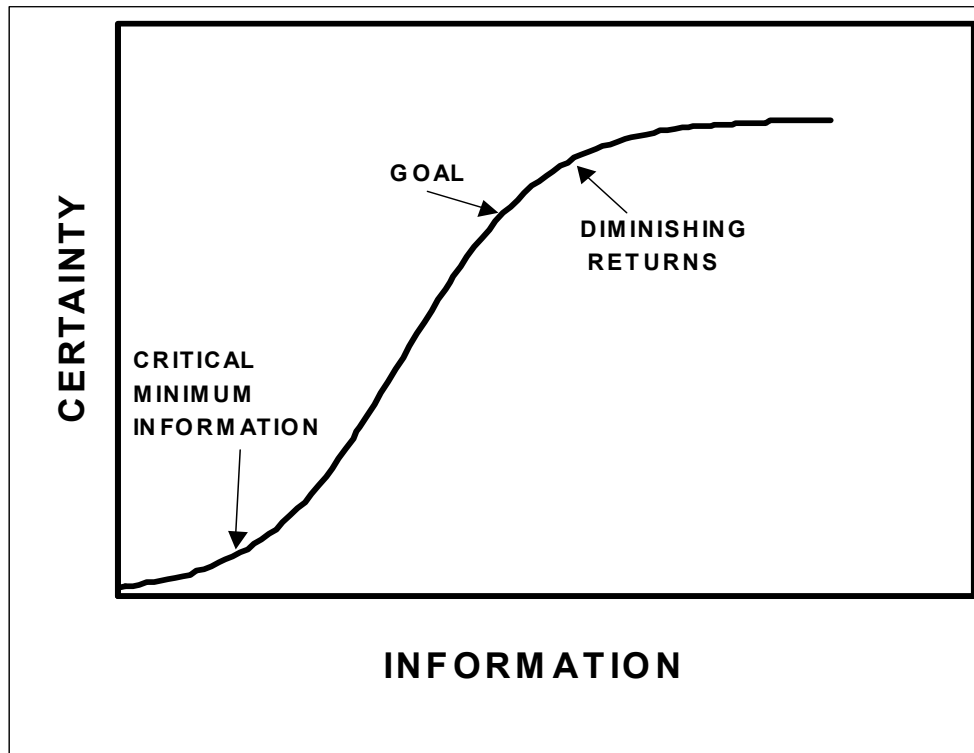


Figure 1. Initial levels of investment in information (like catch monitoring) establish a baseline; intermediate levels of information (I.e. annual resource surveys) produce substantial gains, final levels of investment (like ecosystem research) may have diminishing returns on short-term recommendations, but can substantially affect long-term recommendations. Our goal is to obtain at least an intermediate level of information for west coast groundfish.

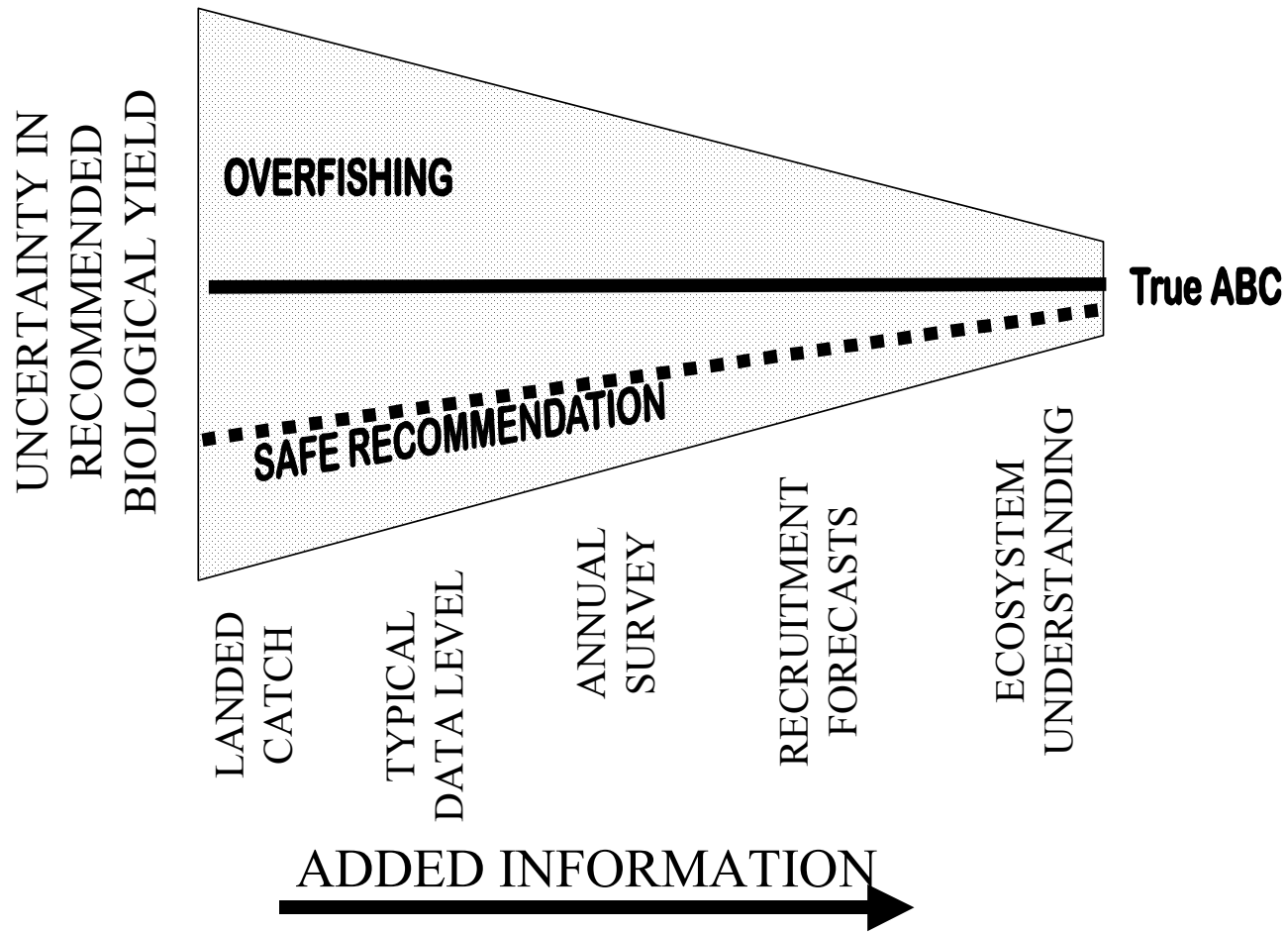


Figure 2. With a low level of information, there is a broad potential range of estimated biological yield (ABC). A precautionary approach responds to this uncertainty by setting recommendations safely below the “best estimate” to avoid accidentally exceeding the true value and overfishing. The progression towards reduced uncertainty is not as linear as indicated in this diagram. Some information, especially annual surveys, makes a great improvement in certainty as long as it is combined with adequate information of other types (Figure 1).

# COMPREHENSIVE GROUNDFISH RESEARCH PLAN

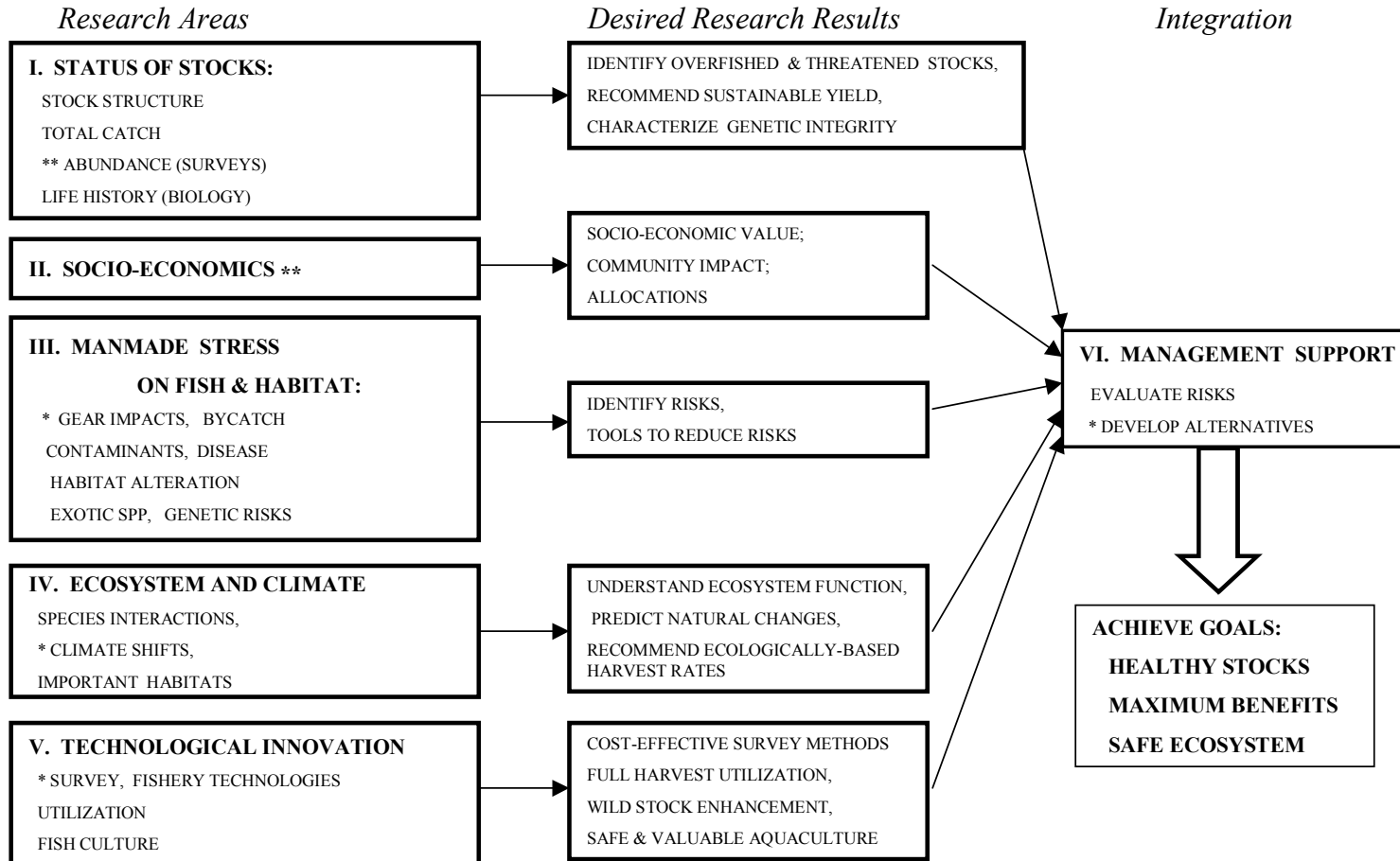


Figure 3. Relationships among major research areas. Areas I to V provide research information. Area VI integrates research results for management support. Within each area, topics with \*\* are high priority, and topics with \* and second tier priority.

# STOCK ASSESSMENT PROCESS

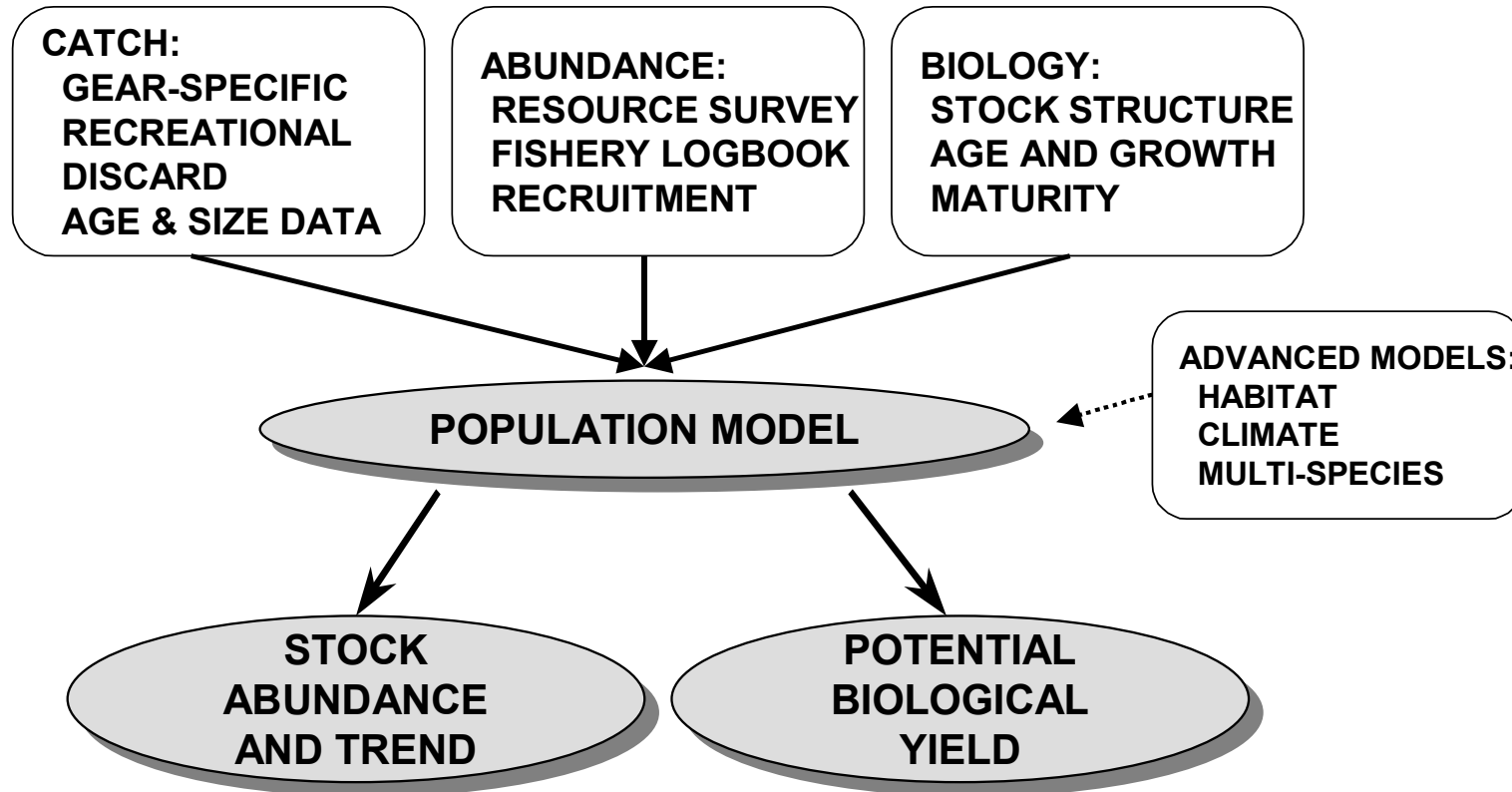


Figure 4. Stock assessments use population models to integrate catch, abundance and biological data. The results are estimates of stock abundance, and fishery potential yield. Future models may be able to directly incorporate habitat, climate, and multi-species factors.

**Table 1. Species composition of groundfish assemblages, degree of assessment information, status of population abundance, and landed commercial catch in 1998. Species list is sorted by Common Name within each Assemblage.**

Common Name	Genus Species	Category	Assemblage	Assessment (1)	Status (2)	1998
						CATCH (3)
Dover sole	<i>Microstomus pacificus</i>	Flatfish	deep slope	full	near	7982
longspine thornyhead	<i>Sebastolobus altivelis</i>	Rockfish	deep slope	full	above	2305
Pacific rattail	<i>Coryphaenoides acrolepis</i>	Misc.	deep slope	–	???	779
sablefish	<i>Anoplopoma fimbria</i>	Roundfish	deep slope	full	near	4362
shortspine thornyhead	<i>Sebastolobus alascanus</i>	Rockfish	deep slope	full	near	1225
Pacific whiting	<i>Merluccius productus</i>	Roundfish	midwater	full	near	227501
shortbelly rockfish	<i>Sebastes jordani</i>	Rockfish	midwater	partial	???	19
arrowtooth flounder	<i>Atheresthes storiias</i>	Flatfish	nearshore flatfish	partial	???	3169
butter sole	<i>Isopsetta isolepis</i>	Flatfish	nearshore flatfish	–	???	5
curfin sole	<i>Pleuronichthys decurrens</i>	Flatfish	nearshore flatfish	–	???	3
English sole	<i>Parophrys vetulus</i>	Flatfish	nearshore flatfish	full	above	1138
flathead sole	<i>Hippoglossoides elassodon</i>	Flatfish	nearshore flatfish	–	???	3
Pacific sanddab	<i>Citharichthys sordidus</i>	Flatfish	nearshore flatfish	–	???	777
petrale sole	<i>Eopsetta jordani</i>	Flatfish	nearshore flatfish	full	near	1463
rex sole	<i>Glyptocephalus zachirus</i>	Flatfish	nearshore flatfish	–	???	636
rock sole	<i>Lepidopsetta bilineata</i>	Flatfish	nearshore flatfish	–	???	43
sand sole	<i>Psettichthys melanostictus</i>	Flatfish	nearshore flatfish	–	???	86
starry flounder	<i>Platichthys stellatus</i>	Flatfish	nearshore flatfish	–	???	98
other and unspecified flatfish						57
black and yellow rockfish	<i>Sebastes chrysomelas</i>	Rockfish	nearshore	–	???	11
black rockfish	<i>Sebastes melanops</i>	Rockfish	nearshore	full	above	290
blue rockfish	<i>Sebastes mystinus</i>	Rockfish	nearshore	–	???	57
brown rockfish	<i>Sebastes auriculatus</i>	Rockfish	nearshore	–	???	10
cabezon	<i>Scorpaenichthys marmoratus</i>	Roundfish	nearshore	–	???	196
calico rockfish	<i>Sebastes dalli</i>	Rockfish	nearshore	–	???	?
California scorpionfish	<i>Scorpaena guttata</i>	Rockfish	nearshore	–	???	?
China rockfish	<i>Sebastes nebulosus</i>	Rockfish	nearshore	–	???	12
copper rockfish	<i>Sebastes caurinus</i>	Rockfish	nearshore	–	???	33
grass rockfish	<i>Sebastes rastrelliger</i>	Rockfish	nearshore	–	???	42
kelp greenling	<i>Hexagrammos decagrammus</i>	Roundfish	nearshore	–	???	7
kelp rockfish	<i>Sebastes atrovirens</i>	Rockfish	nearshore	–	???	2
olive rockfish	<i>Sebastes serranoides</i>	Rockfish	nearshore	–	???	1
quillback rockfish	<i>Sebastes maliger</i>	Rockfish	nearshore	–	???	14
treefish	<i>Sebastes serriceps</i>	Rockfish	nearshore	–	???	0
aurora rockfish	<i>Sebastes aurora</i>	Rockfish	slope rockfish	–	???	42
bank rockfish	<i>Sebastes rufus</i>	Rockfish	slope rockfish	partial	???	458
blackgill rockfish	<i>Sebastes melanostomus</i>	Rockfish	slope rockfish	partial	???	221
darkblotched rockfish	<i>Sebastes crameri</i>	Rockfish	slope rockfish	partial	???	715
Pacific ocean perch	<i>Sebastes alutus</i>	Rockfish	slope rockfish	full	overfished	580
rougheye rockfish	<i>Sebastes aleutianus</i>	Rockfish	slope rockfish	–	???	176
sharpchin rockfish	<i>Sebastes zacentrus</i>	Rockfish	slope rockfish	partial	???	114
shorttraker rockfish	<i>Sebastes borealis</i>	Rockfish	slope rockfish	–	???	58
splitnose rockfish	<i>Sebastes diploproa</i>	Rockfish	slope rockfish	partial	???	1322

bocaccio	Sebastes paucispinis	Rockfish	shelf	full	overfished	399
bronzespotted rockfish	Sebastes gilli	Rockfish	shelf	--	???	1
canary rockfish	Sebastes pinniger	Rockfish	shelf	full	overfished	1139
chilipepper	Sebastes goodei	Rockfish	shelf	full	above	1273
cowcod	Sebastes levis	Rockfish	shelf	full	overfished	19
dusty rockfish	Sebastes ciliatus	Rockfish	shelf	--	???	?
flag rockfish	Sebastes rubrivinctus	Rockfish	shelf	--	???	1
gopher rockfish	Sebastes carnatus	Rockfish	shelf	--	???	22
greenblotched rockfish	Sebastes rosenblatti	Rockfish	shelf	--	???	3
greenspotted rockfish	Sebastes chlorostictus	Rockfish	shelf	--	???	23
greenstriped rockfish	Sebastes elongatus	Rockfish	shelf	--	???	180
harlequin rockfish	Sebastes variegatus	Rockfish	shelf	--	???	?
honeycomb rockfish	Sebastes umbrosus	Rockfish	shelf	--	???	?
lingcod	Ophiodon elongatus	Roundfish	shelf	full	overfished	348
Mexican rockfish	Sebastes macdonaldi	Rockfish	shelf	--	???	?
Pacific cod	Gadus macrocephalus	Roundfish	shelf	--	???	413
pink rockfish	Sebastes eos	Rockfish	shelf	--	???	2
redbanded rockfish	Sebastes babcocki	Rockfish	shelf	--	???	46
redstripe rockfish	Sebastes proriger	Rockfish	shelf	partial	???	102
rosethorn rockfish	Sebastes helvomiculatus	Rockfish	shelf	--	???	24
rosy rockfish	Sebastes rosaceus	Rockfish	shelf	--	???	1
silvergray rockfish	Sebastes brevispinis	Rockfish	shelf	partial	???	275
speckled rockfish	Sebastes ovalis	Rockfish	shelf	--	???	4
squarespot rockfish	Sebastes hopkinsi	Rockfish	shelf	--	???	0
starry rockfish	Sebastes constellatus	Rockfish	shelf	--	???	7
stripetail rockfish	Sebastes saxicola	Rockfish	shelf	--	???	20
tiger rockfish	Sebastes nigrocinctus	Rockfish	shelf	--	???	1
vermillion rockfish	Sebastes miniatus	Rockfish	shelf	--	???	27
widow rockfish	Sebastes entomelas	Rockfish	shelf	full	below	3893
yelloweye rockfish	Sebastes ruberrimus	Rockfish	shelf	partial	???	110
yellowmouth rockfish	Sebastes reedi	Rockfish	shelf	--	???	54
yellowtail rockfish	Sebastes flavidus	Rockfish	shelf	full	near	2889
<i>unspecified nearshore/shelf/slope rockfish</i>						1699
finescale codling	Antimora microlepis	Misc.	misc	--	???	?
ratfish	Hydrolagus coliei	Misc.	misc	--	???	0
leopard shark	Triakis semifasciata	Shark	misc	--	???	?
southern shark	Galeorhinus zyopterus	Shark	misc	--	???	?
spiny dogfish	Squalus acanthias	Shark	misc	--	???	461
<i>unspecified shark</i>						1027
big skate	Raja binoculata	Skate	misc	--	???	?
California skate	Raja inornata	Skate	misc	--	???	?
longnose skate	Raja rhina	Skate	misc	--	???	?
<i>unspecified skate</i>						1175
<i>miscellaneous groundfish</i>						1397

(1) Full assessments provide information on the abundance of the stock relative to historical and target levels, and provide information on current potential yield. Partial assessments do not have enough data to provide this full assessment. Within the range of full assessments, there is a wide range of data availability and resulting assessment certainty.

(2) Status of species is identified relative to target abundance levels, typically 35-40% of unfished levels. Overfished stocks are below 25% of unfished levels.

(3) Landed commercial catch in 1998 from PacFIN. For rockfish, the catch reported here is the sum of catch broken out to species from species composition samples plus recorded catch for species with required sorting. This leaves 1699 mt tons of catch of unspecified rockfish species, primarily composed of the many species for which there is no stock assessment.

