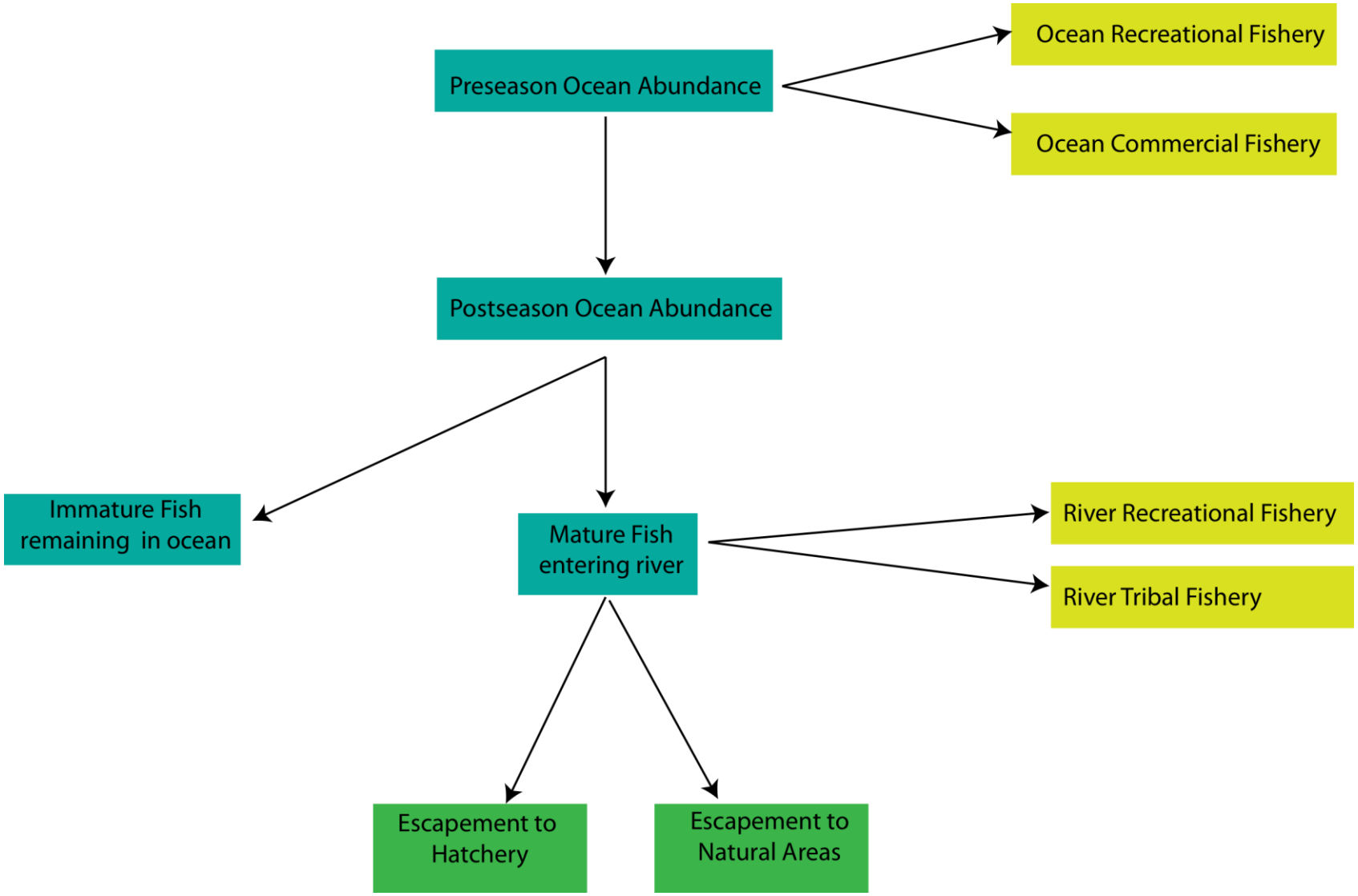
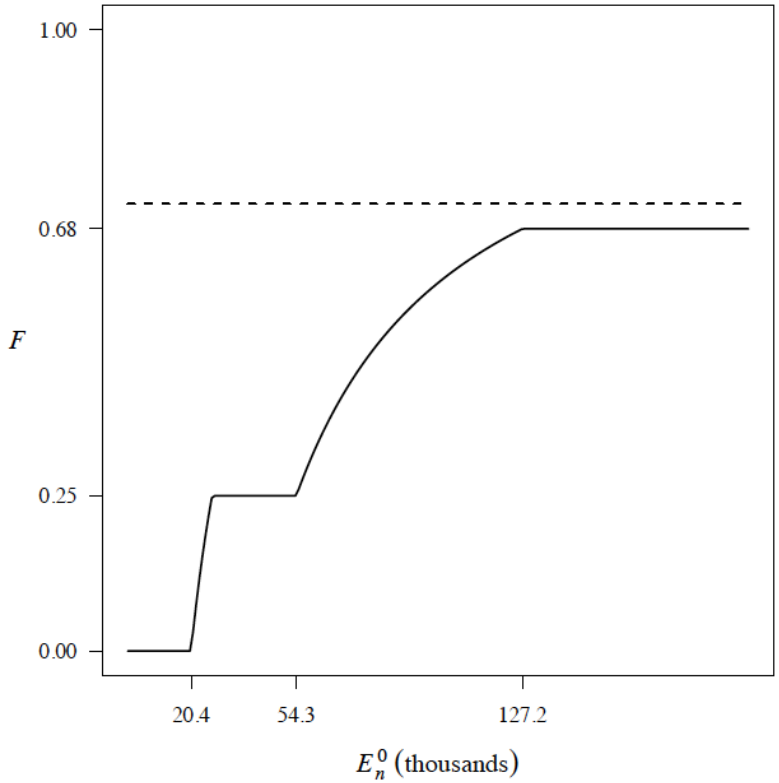
Klamath Harvest Rate Model



Management parameters

- spawner reduction rate
- harvest allocation among fishery sectors



Fishery parameters

- vulnerabilities (age, sector)
- proportion legal (age, sector)
- shaker mortality rate (age, sector)
- drop-off mortality rate (age, sector)

Biological parameters

- Pre-season ocean abundance (age)
- ocean survival rate (age)
- maturation rate (age)
- out-of-basin stray rate (age)
- proportion spawners using natural areas (age)

Constraints

- total harvest rate cap
- age 4 ocean harvest rate cap
- river recreational harvest capacity cap

Calculation sequence

1. From F, compute harvest allocations (numerical solution)
2. ocean fishery contact rates
3. age 4 harvest rate
4. if over cap, recompute ocean contact rates and harvest allocations
5. contacts, harvests, shakers, drop-offs, impacts for ocean fisheries
6. maturation, next year's fish in ocean
7. if river rec harvest over cap, reset to cap
8. river fishery contact rates
9. contacts, harvests, shakers, drop-offs, impacts for ocean fisheries
10. escapement to natural areas and hatcheries

TABLE 2.—Harvest projections from the Klamath Harvest Rate Model (KHRM) and Klamath Ocean Harvest Model (KOHM; a more detailed complementary model) for Klamath River fall chinook salmon in the 2000 fishing year. See Table 1 for symbol definitions.

	Projection (number of fish)	
Harvest variable	KHRM	KOHM
$H_{\omega,3}$	18,555	19,480
$H_{\omega,4}$	4,738	4,310
$H_{\omega,5}$	224	203
H_{ω}	23,517	23,993
H_r	4,150	4,234
Nontribal harvest	27,667	28,227
H_t	27,667	28,227
Total harvest	55,335	56,454
Harvest rates		
$H_{o,3}/N_3$	10.6%	11.1%
$H_{o,4}/N_4$	15.1%	13.7%
$H_{o,5}/N_5$	15.0%	13.1%

Prager and Mohr, N Am J Fish Man 21:533 (2001)