Suisun Marsh Fishes

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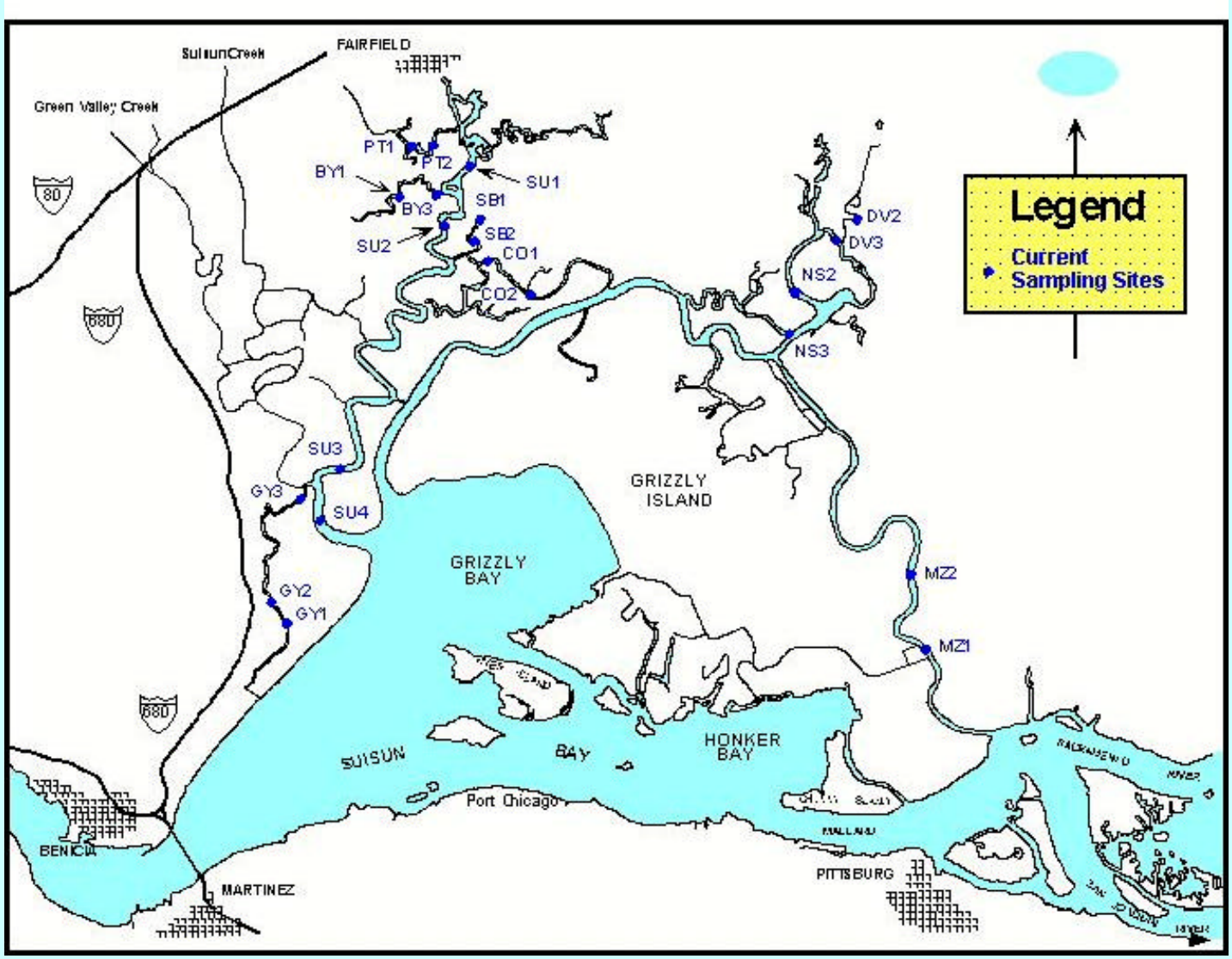
Suisun Marsh Fish Study

- 23 years of monthly samples
- Funding by DWR/IEP
- What regulates fish abundance?
- What are long term trends in abundance?
- Do native and alien fish populations behave differently?
- Are there predictable fish assemblages?

Suisun Marsh

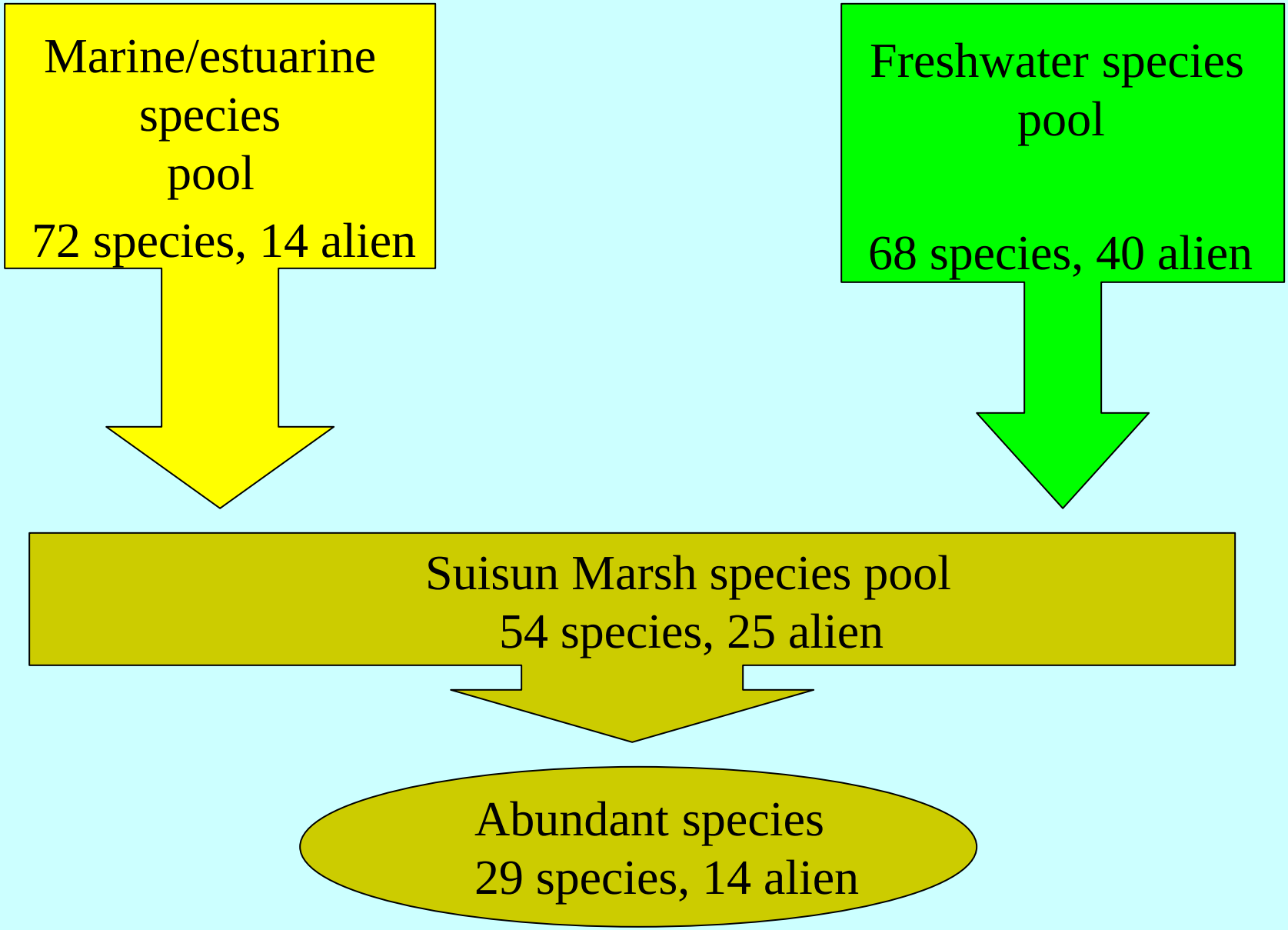
Monthly sampling since 1979

Davis

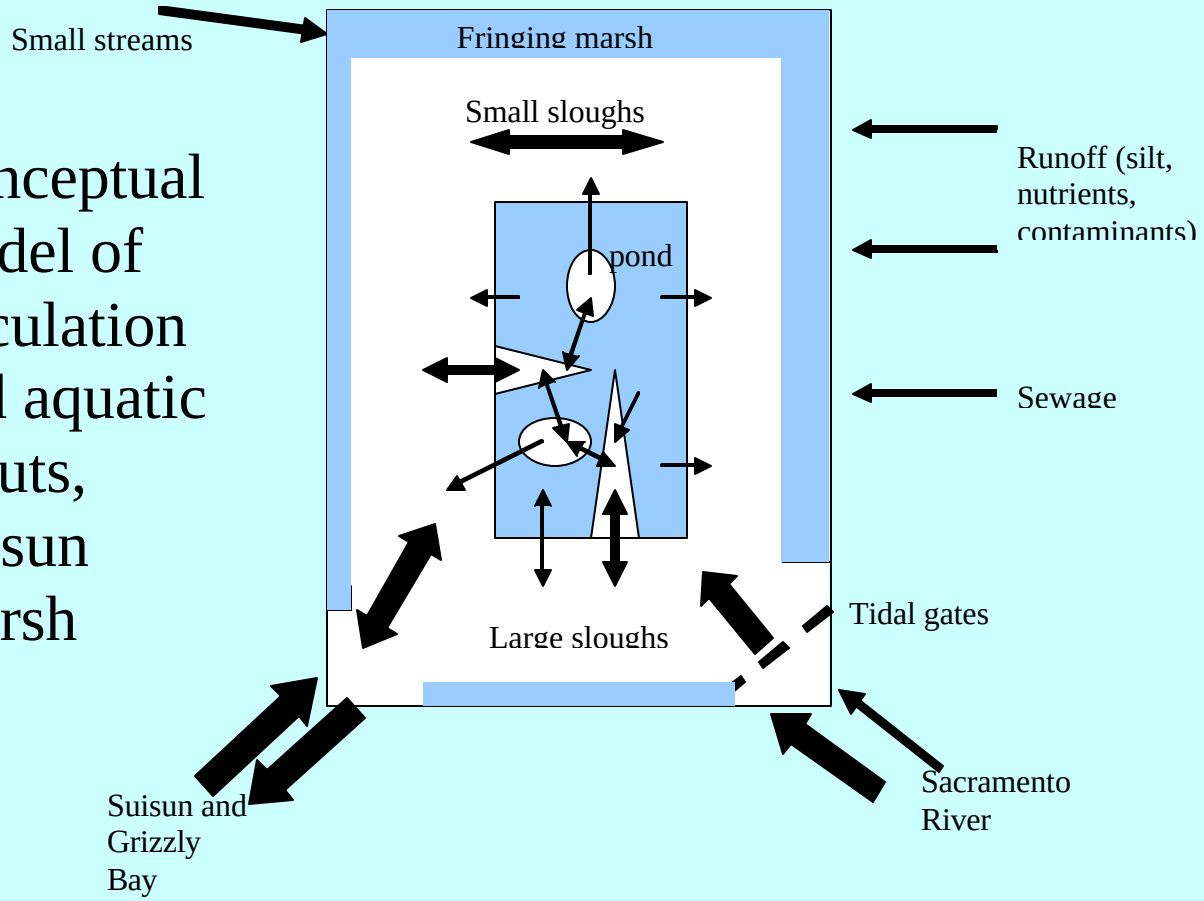


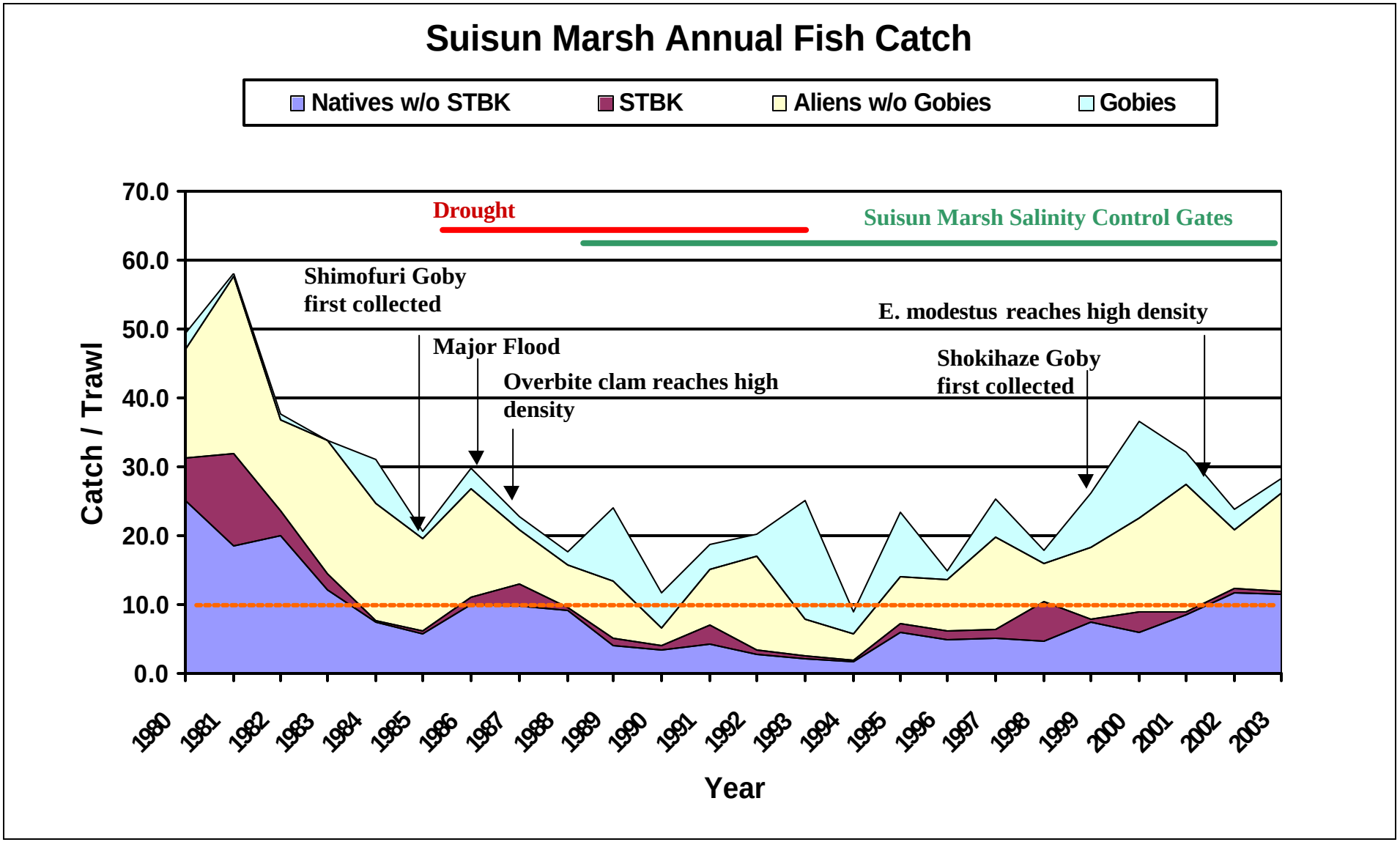
San Francisco

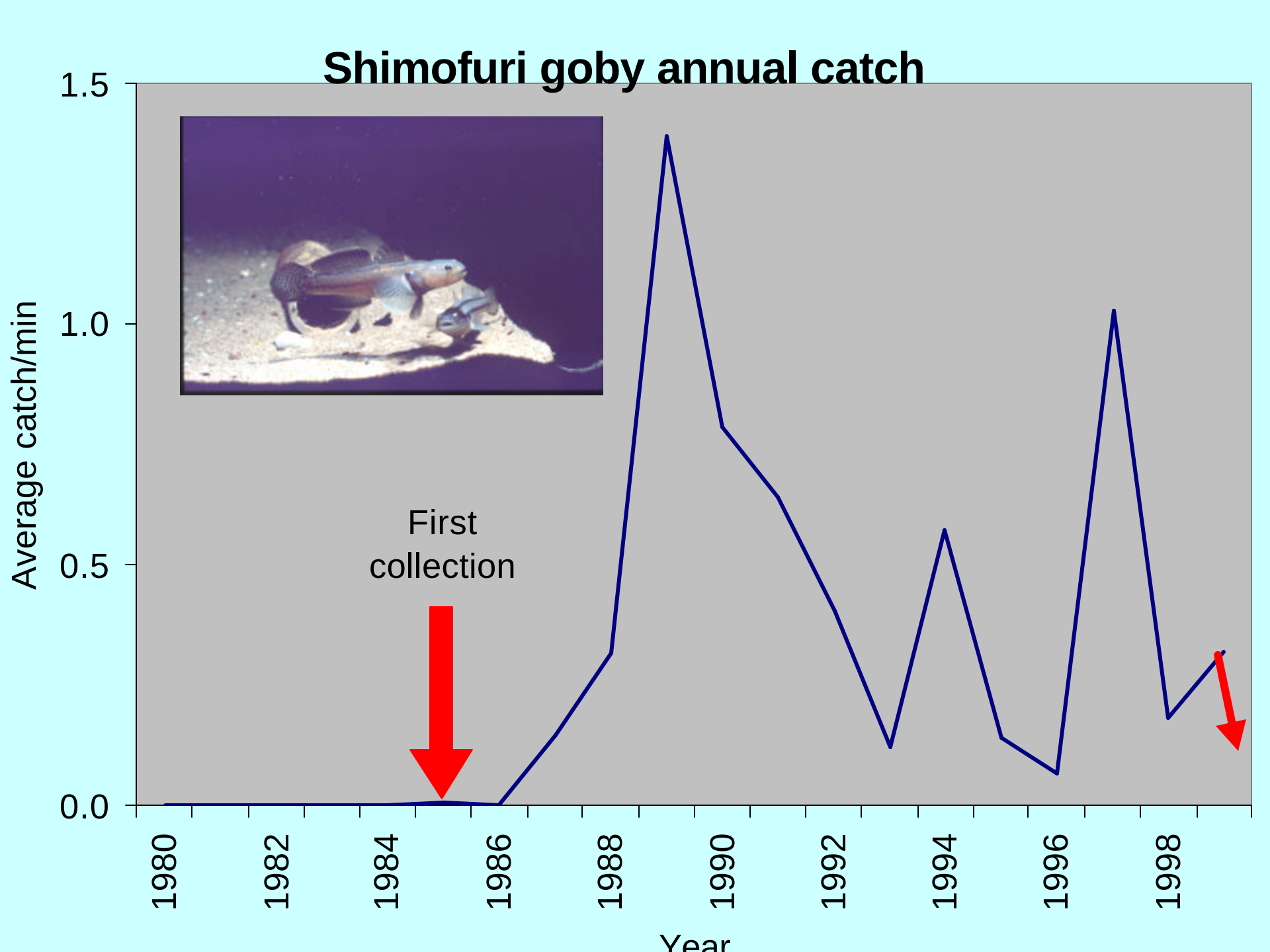
Study is on ecology of entire fish assemblage


Marine/estuarine species pool
72 species, 14 alien
Freshwater species pool
68 species, 40 alien
Suisun Marsh species pool
54 species, 25 alien
Abundant species
29 species, 14 alien

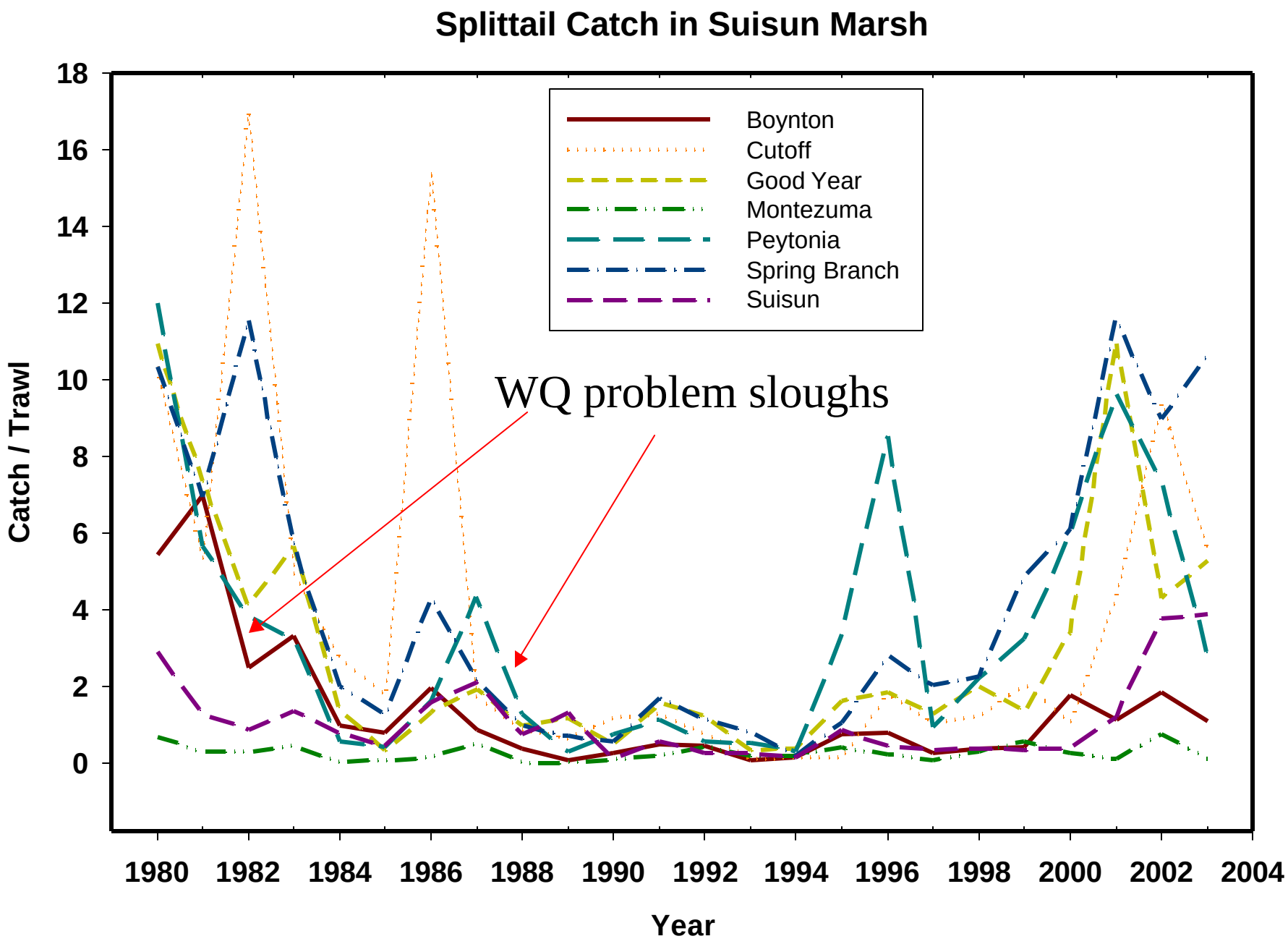
Conceptual model of circulation and aquatic inputs, Suisun Marsh

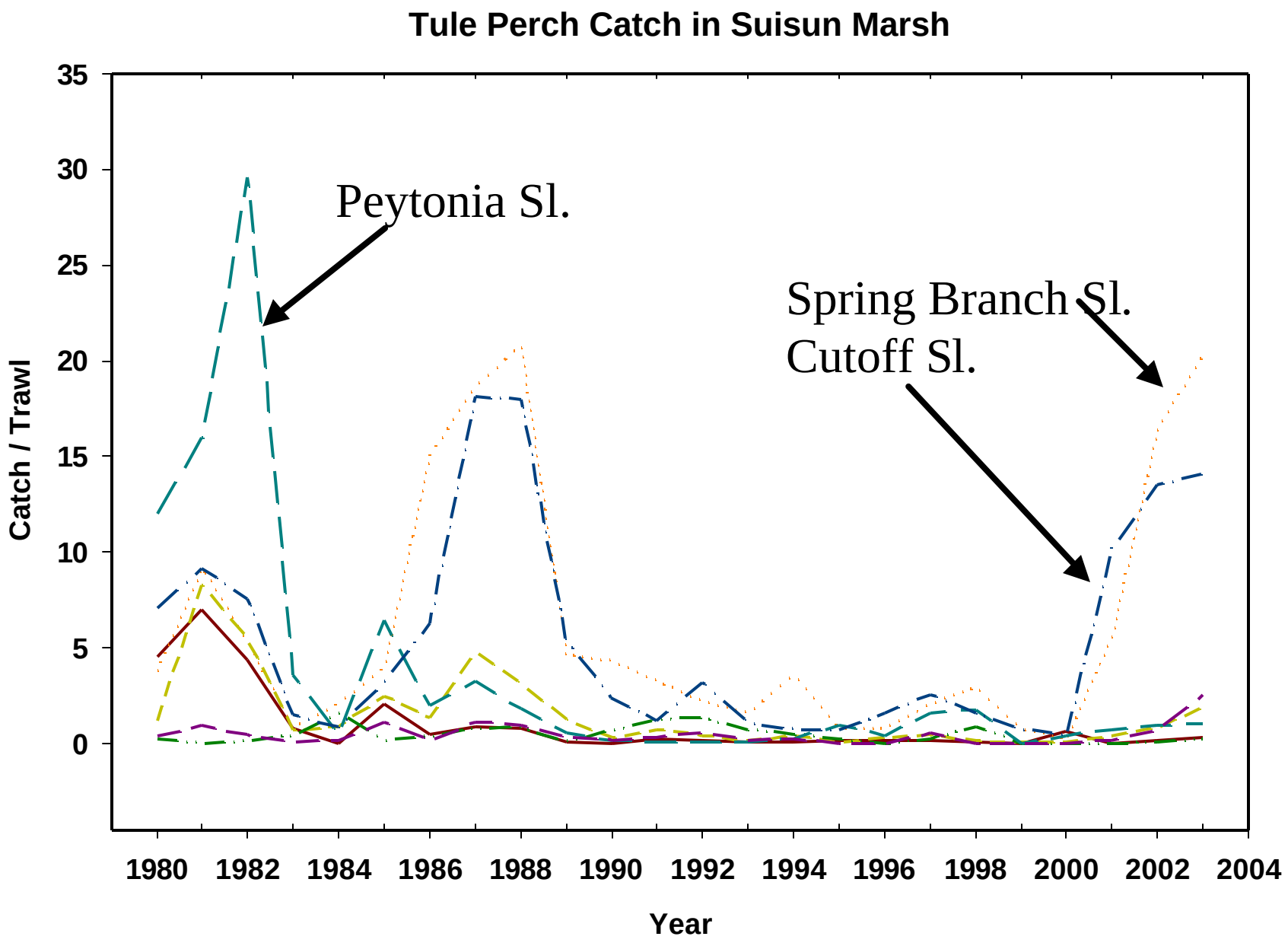


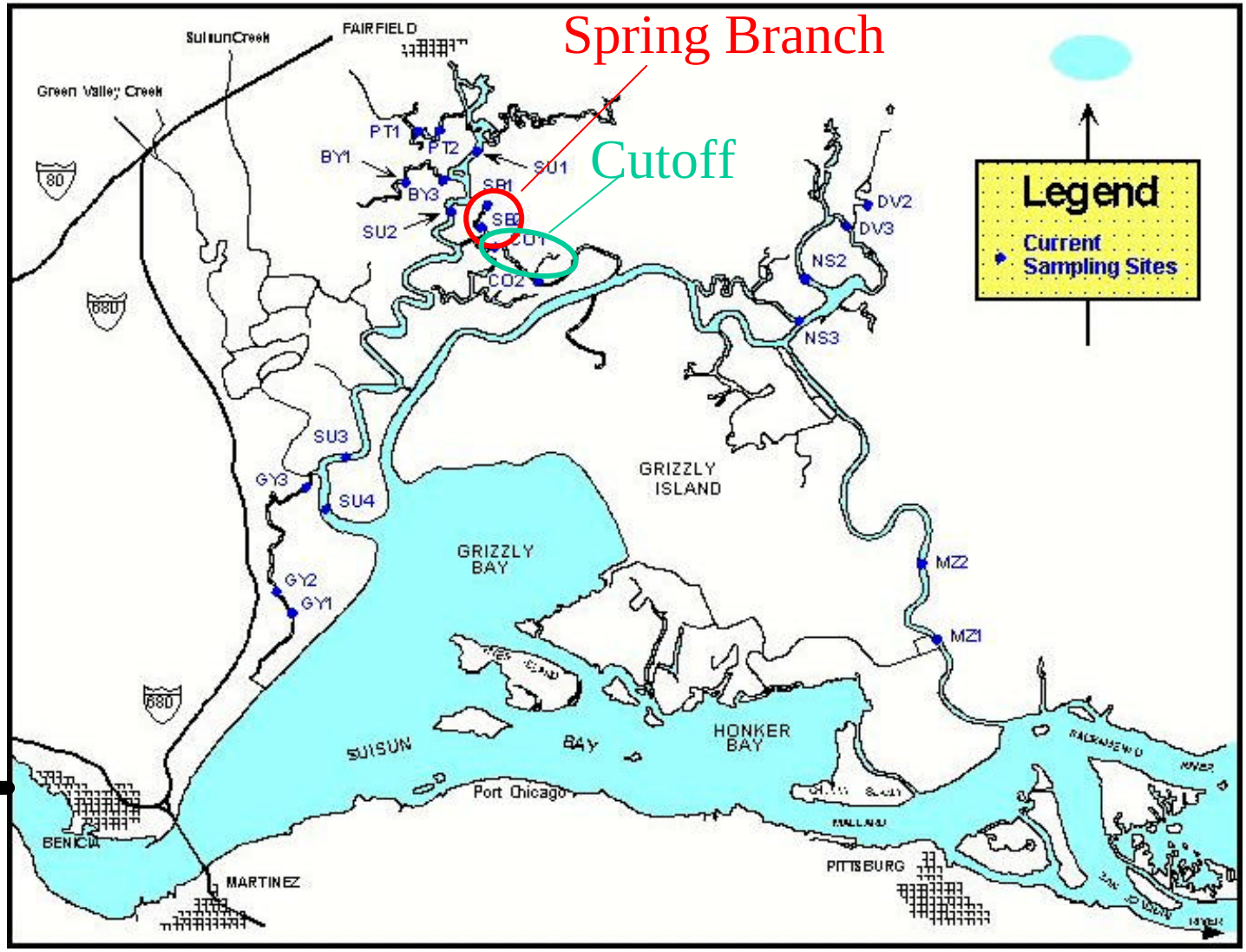

Suisun Marsh Annual Fish Catch
Natives w/o STBK
STBK
Aliens w/o Gobies
Gobies
Drought
Suisun Marsh Salinity Control Gates
Shimofuri Goby first collected
Major Flood
Overbite clam reaches high density
E. modestus reaches high density
Shokihaze Goby first collected
Catch / Trawl
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Year


Shimofuri goby annual catch
Average catch/min
1.5
1.0
0.5
0.0
First
collection
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
Year

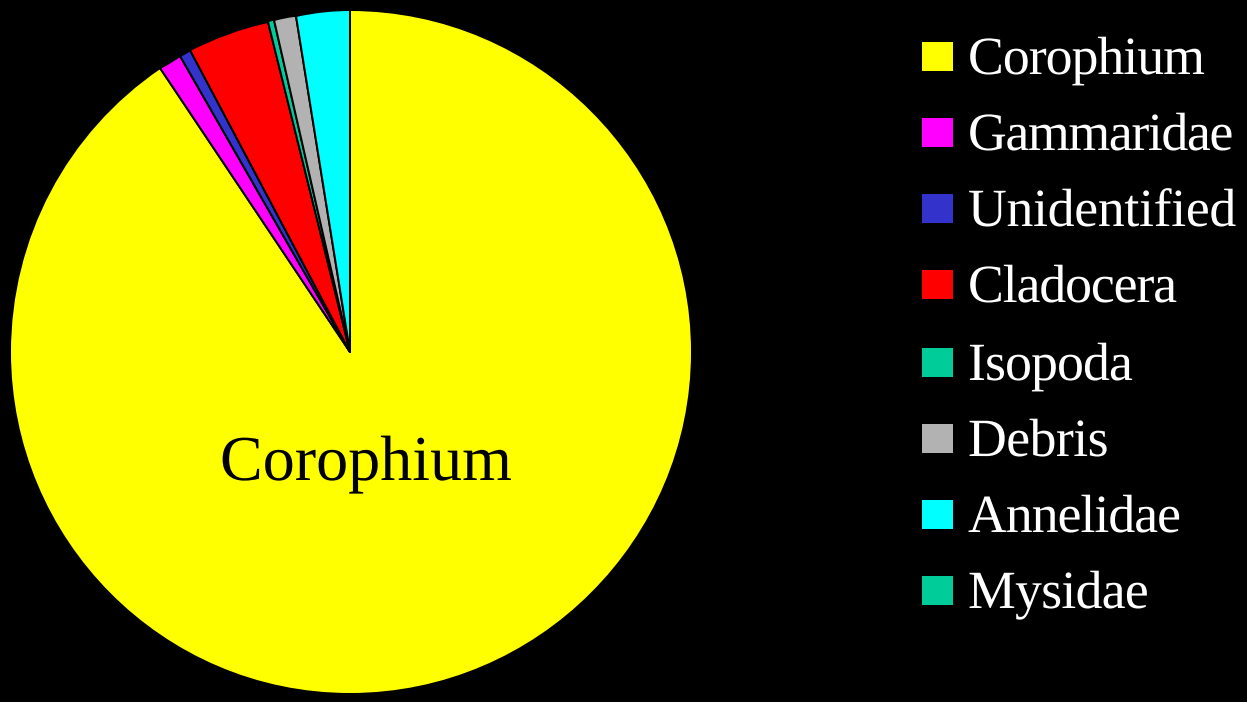
Siberian prawn, *Exopaleomon modestus:* newest invader


Splittail Catch in Suisun Marsh
Catch / Trawl
Year
18
16
14
12
10
8
6
4
2
0
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
Boynton
Cutoff
Good Year
Montezuma
Peytonia
Spring Branch
Suisun
WQ problem sloughs


Tule Perch Catch in Suisun Marsh
Peytonia Sl.
Spring Branch Sl.
Cutoff Sl.
Catch / Trawl
35
30
25
20
15
10
5
0
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
Year



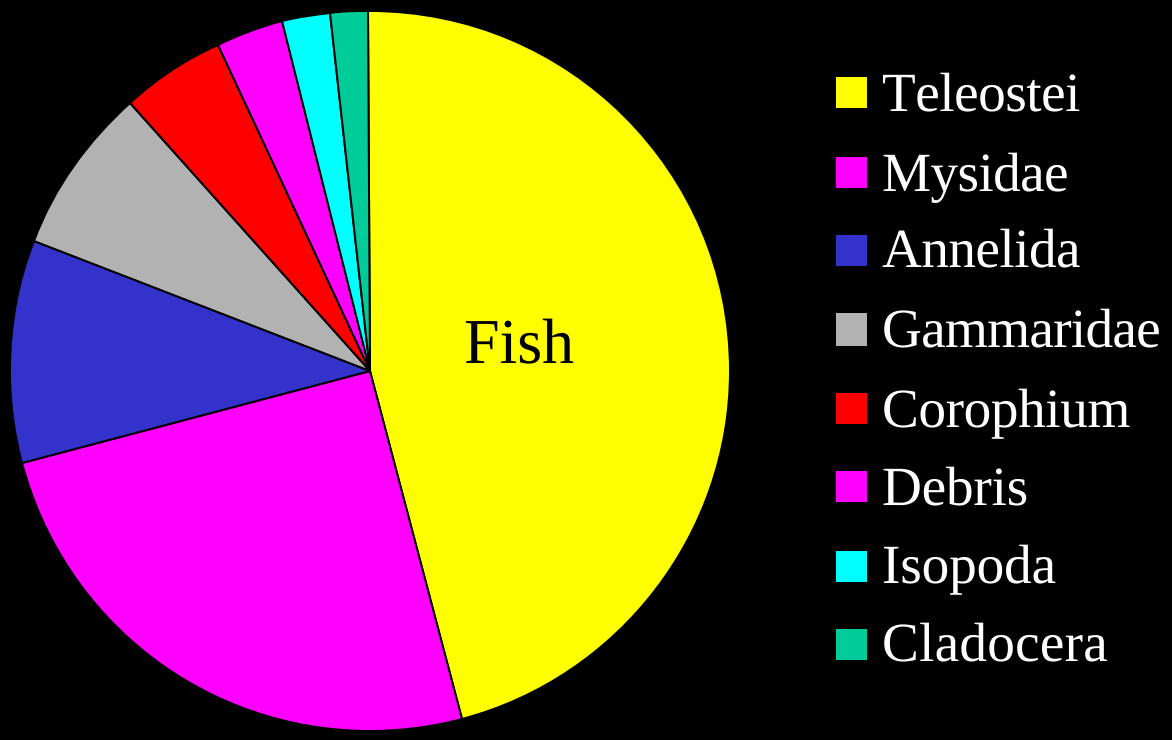
San Fran-cisco Bay



Tule Perch

Hysterocarpus traski

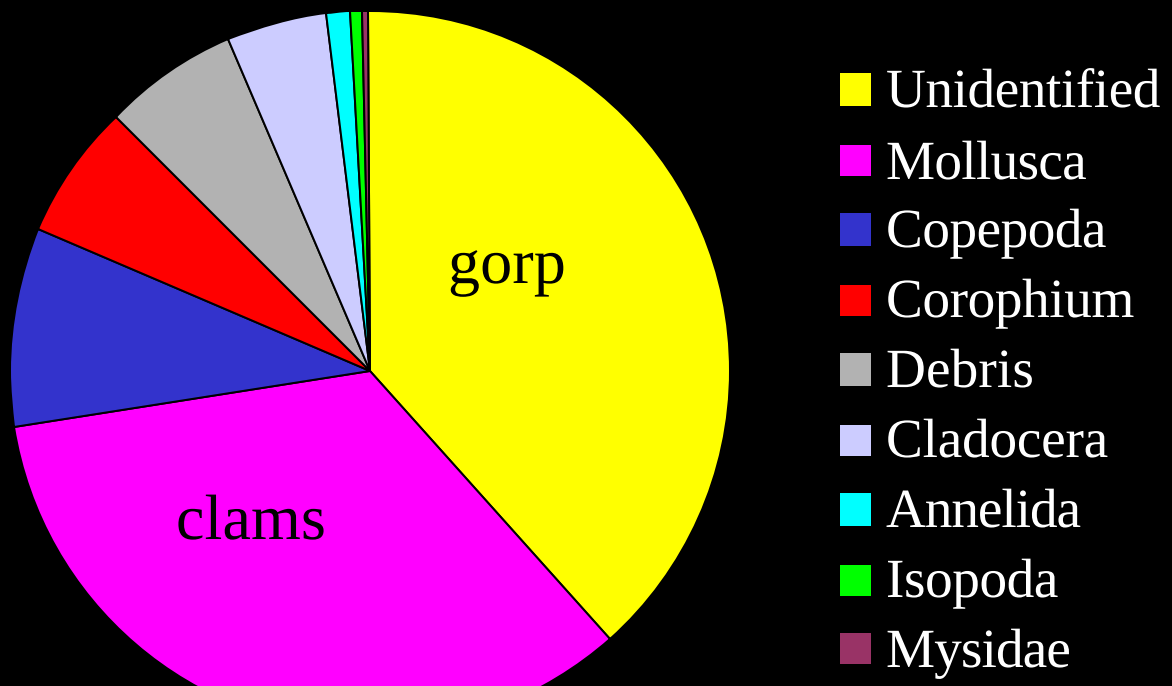
Data from Freyer et al. 2003



Striped Bass

Morone saxatilis

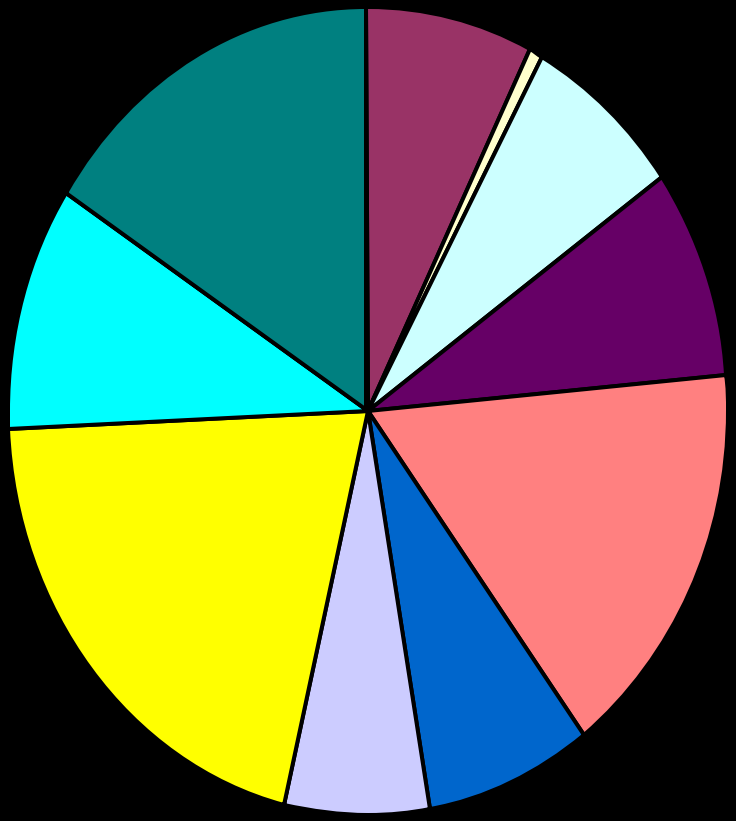
Data from Freyer et al. 2003



Splittail

Pogonichthys macrolepidotus

Data from Freyer et al. 2003



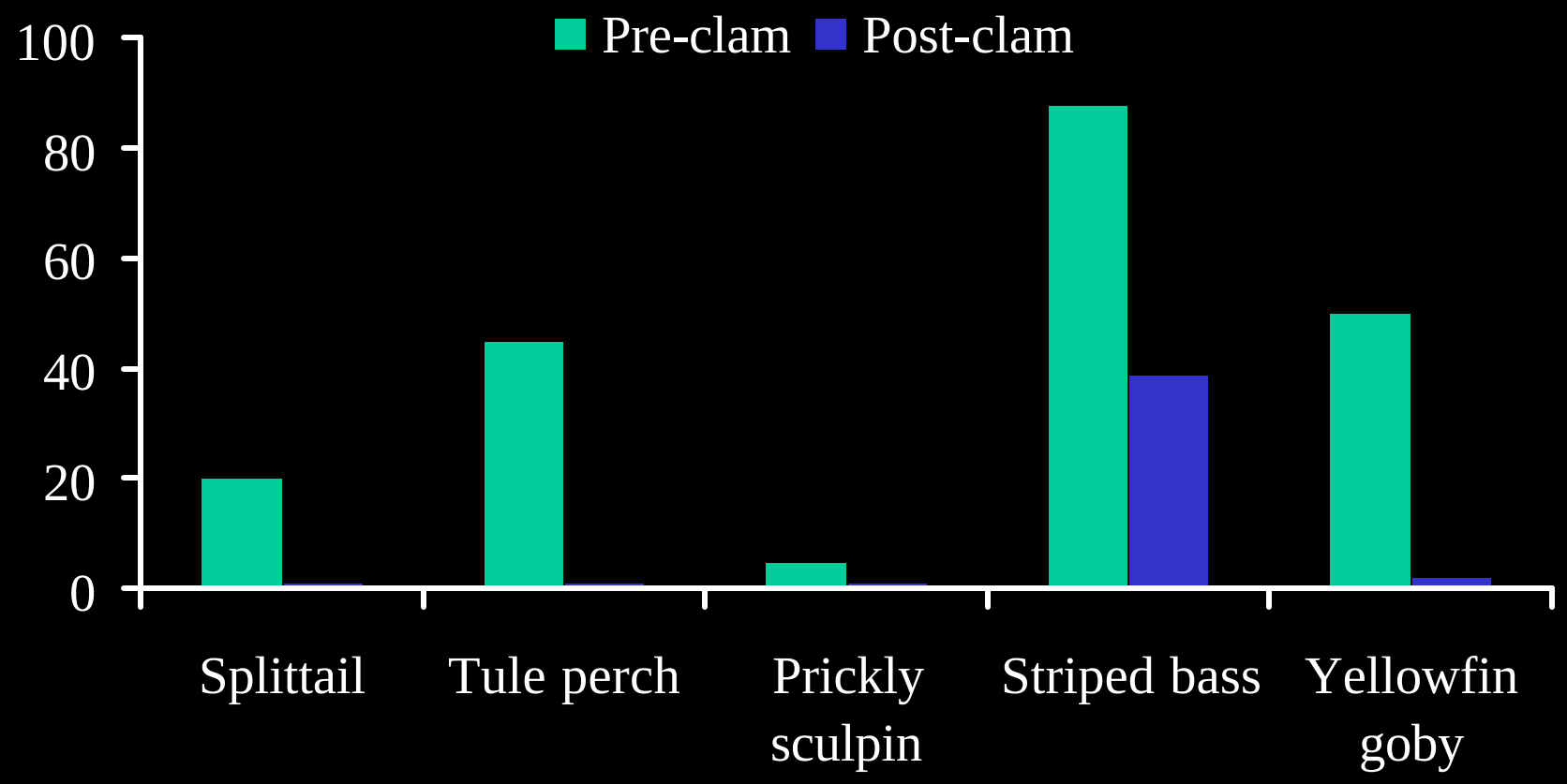
- Detritus
- Bivavle
- Copepods
- Harpacticoids
- Cladocera
- Corophium
- Crangon
- Gammarus
- Gastropods
- Isopods
- Mysids

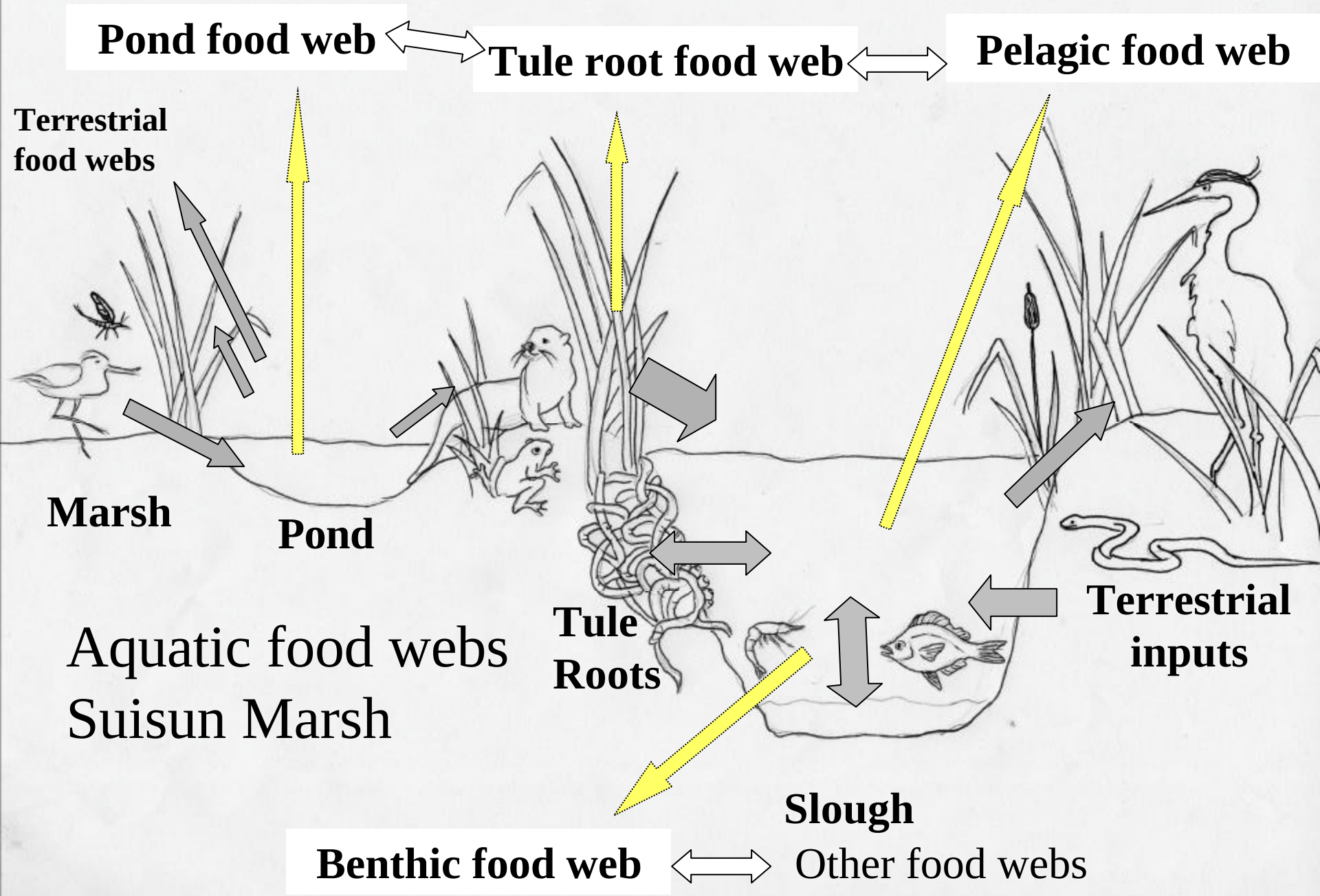
Common carp

Cyprinus carpio

Data from Freyer et al. 2003

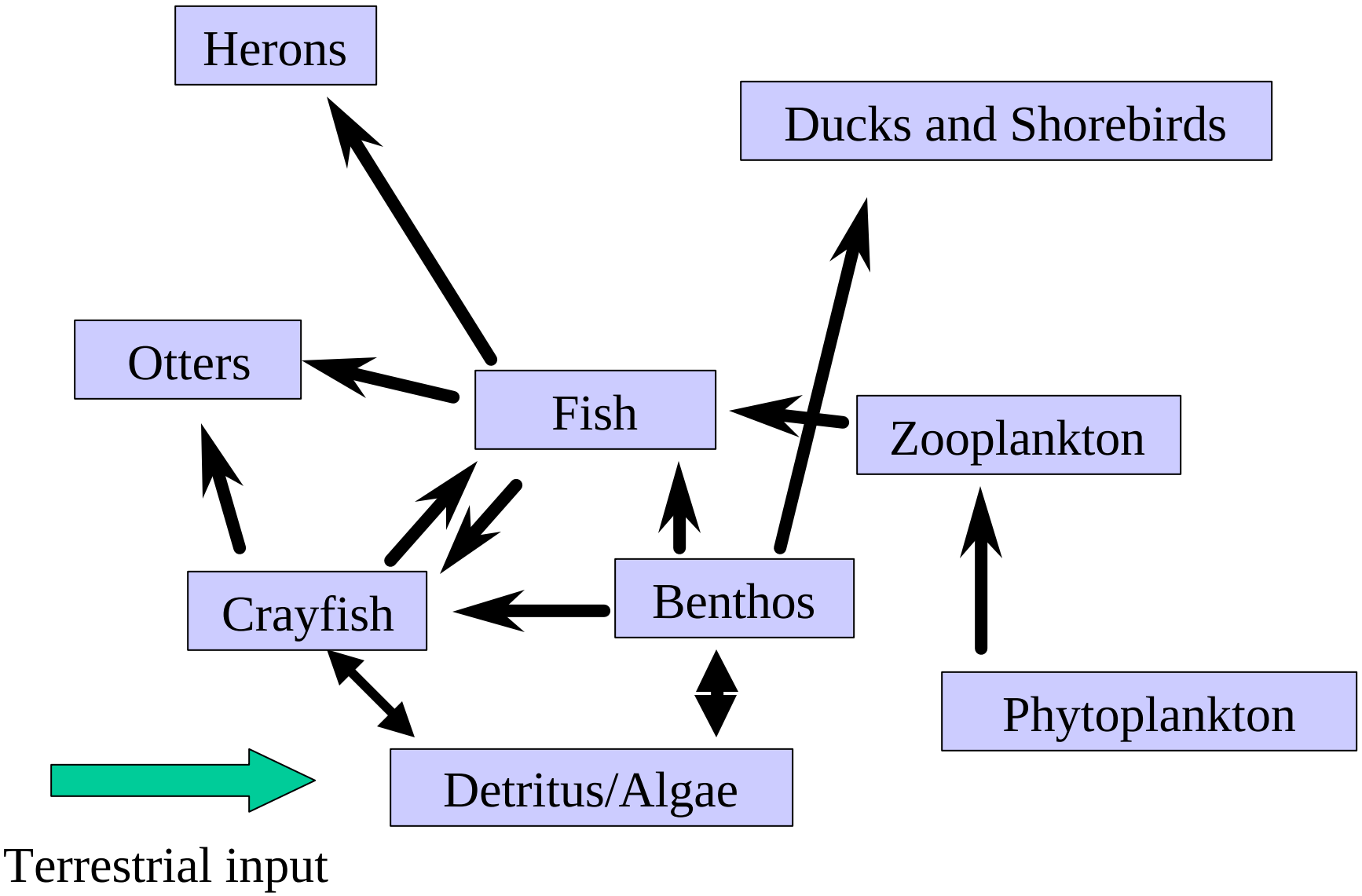
Mysid shrimp in fish diets before and after the overbite (Chinese) clam invasion



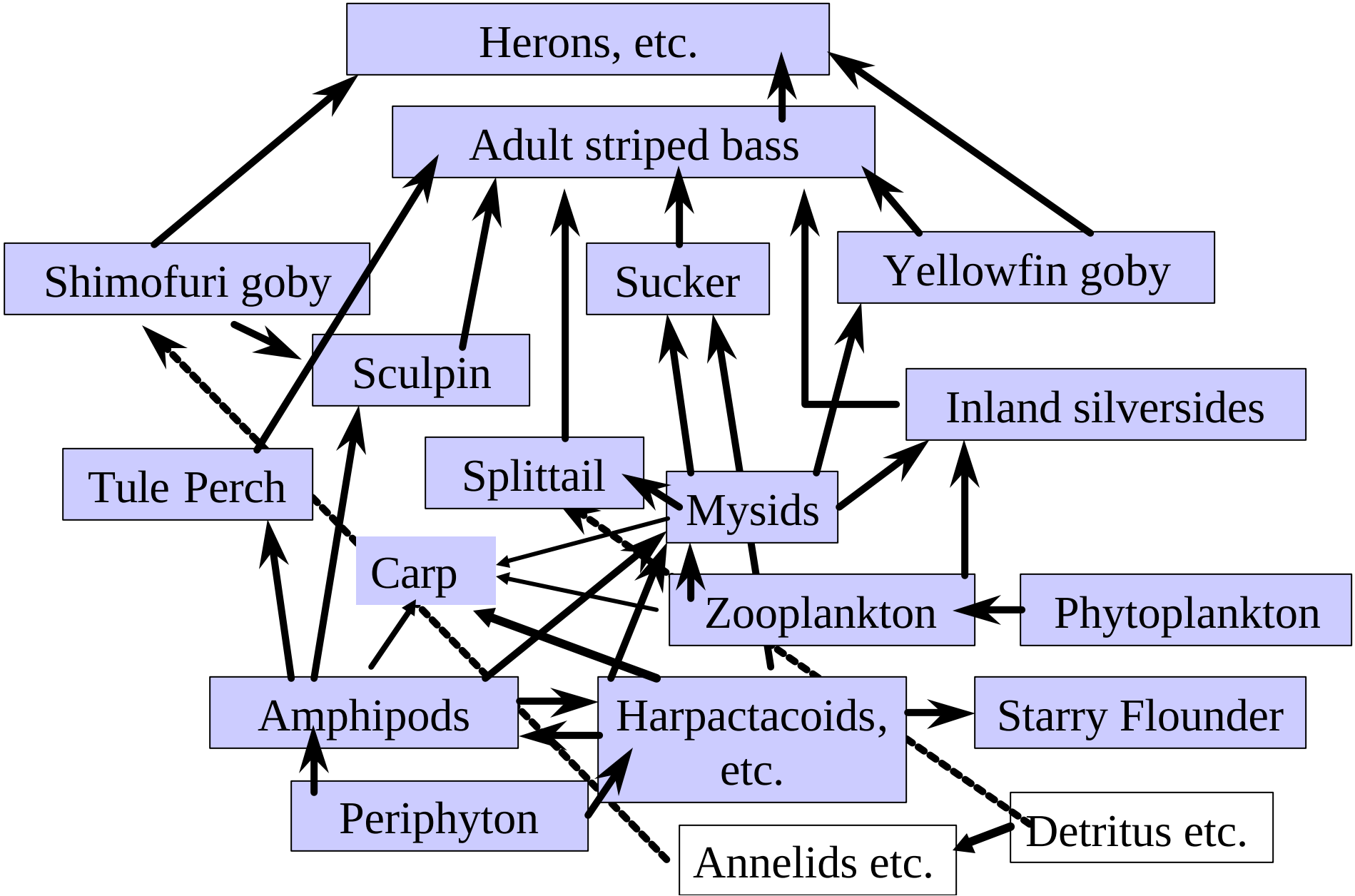


Aquatic food webs
Suisun Marsh

Pond Food Web



Benthic food web



What factors limit Suisun Marsh fishes?

- Recruitment from outside marsh
- Water quality within marsh
  - Dissolved oxygen sags
- Habitat quality
  - Structural complexity
- New invasions
- Species specific factors