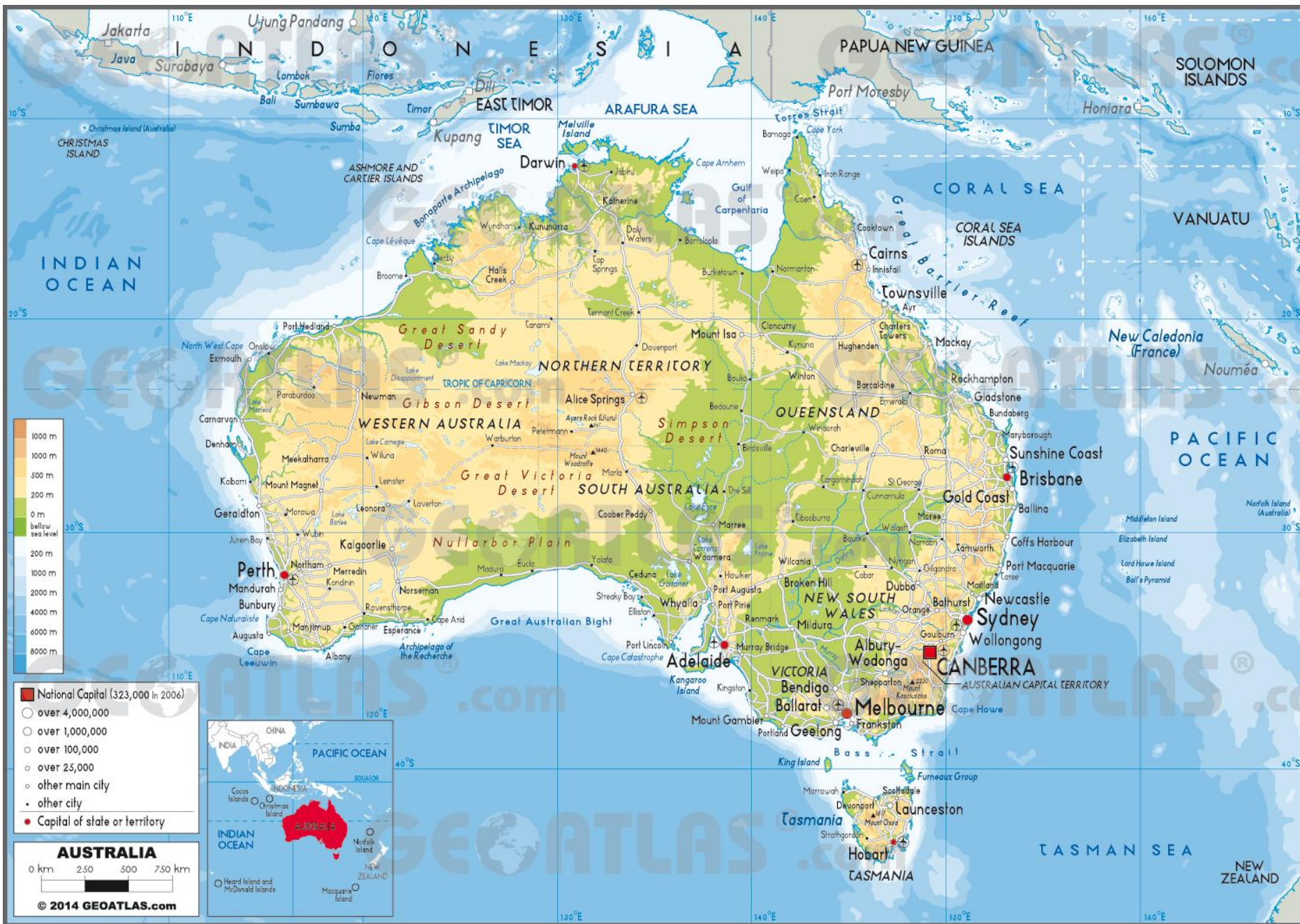# Case study: Multi-sector fisheries management

Dr Michael Smith   &   Dr Athol Whitten
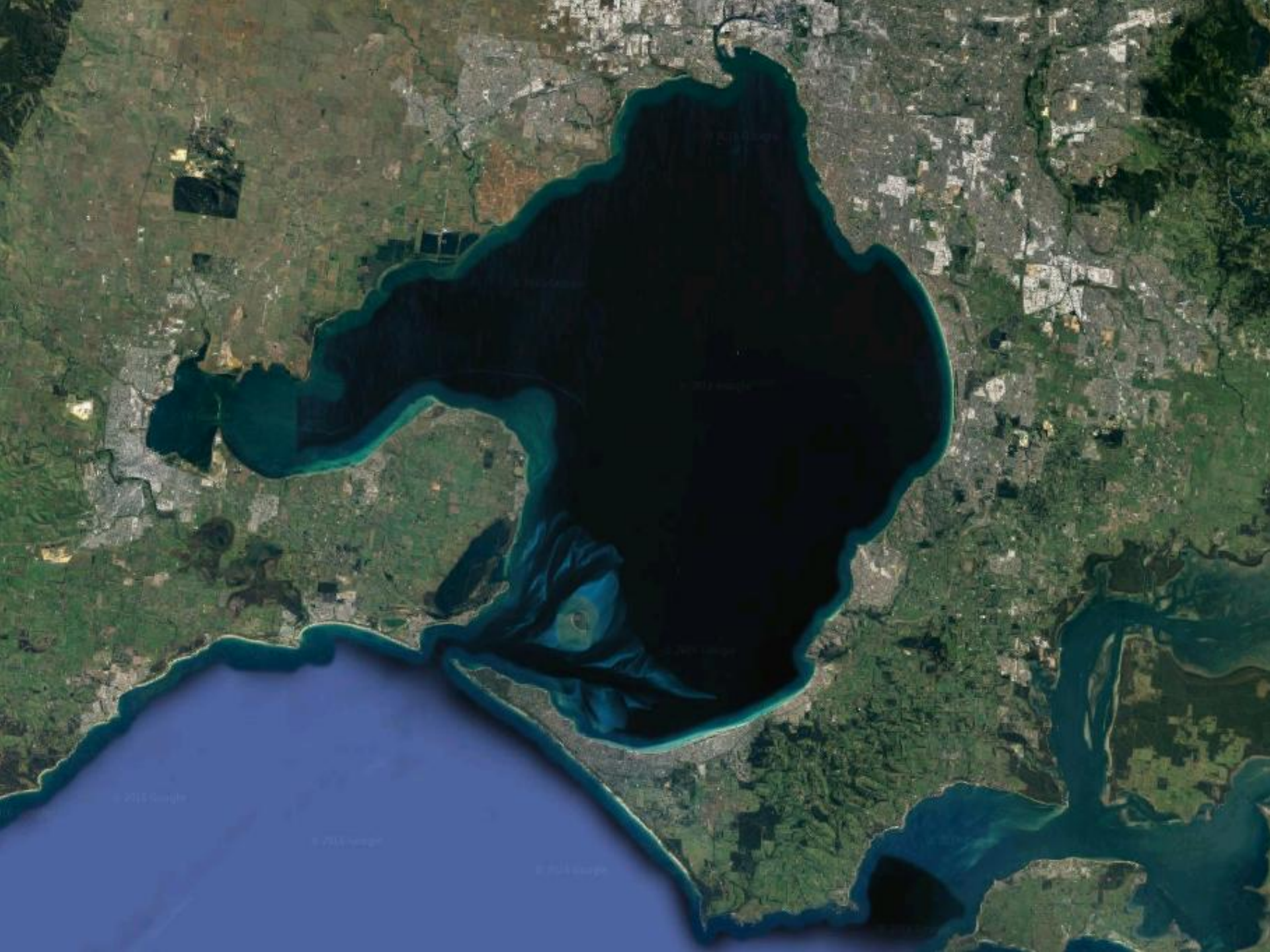
Case Study: Port Phillip Bay

- Purpose: assess and manage fishing activity for commercial and recreational fisheries in PPB

AUSTRALIA

Legend:
- National Capital (323,000 in 2006)
- over 4,000,000
- over 1,000,000
- over 100,000
- over 25,000
- other main city
- other city
- Capital of state or territory

Elevation scale:
1000 m / 1000 m / 500 m / 200 m / 0 m bellow sea level / 200 m / 1000 m / 2000 m / 4000 m / 6000 m / 8000 m

0 km   250   500   750 km

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Oceans and seas: INDIAN OCEAN, PACIFIC OCEAN, CORAL SEA, TIMOR SEA, ARAFURA SEA, TASMAN SEA, Great Australian Bight

States and territories: WESTERN AUSTRALIA, NORTHERN TERRITORY, SOUTH AUSTRALIA, QUEENSLAND, NEW SOUTH WALES, VICTORIA, TASMANIA, AUSTRALIAN CAPITAL TERRITORY

Cities: Darwin, Perth, Adelaide, Melbourne, CANBERRA, Sydney, Brisbane, Hobart, Cairns, Townsville, Alice Springs, Newcastle, Wollongong, Gold Coast, Sunshine Coast, Geelong

Neighboring countries: INDONESIA, EAST TIMOR, PAPUA NEW GUINEA, SOLOMON ISLANDS, VANUATU, New Caledonia (France), NEW ZEALAND

Case Study: Port Phillip Bay

- Purpose: assess and manage fishing activity for commercial and recreational fisheries in PPB

- Several commercial fleets, but also lots of recreational fishing

- 600,000 rec fishers in Victoria

- Government has a policy to grow participation to 1 million by 2020

- 88% of total catch of snapper, 80% flathead, 50% King George whiting were caught by recreational fishers

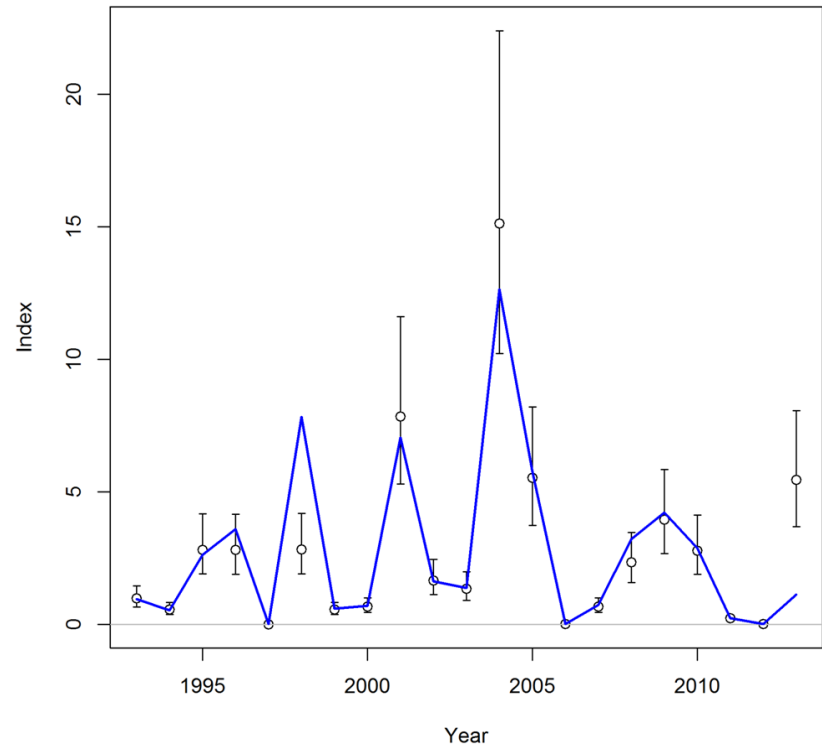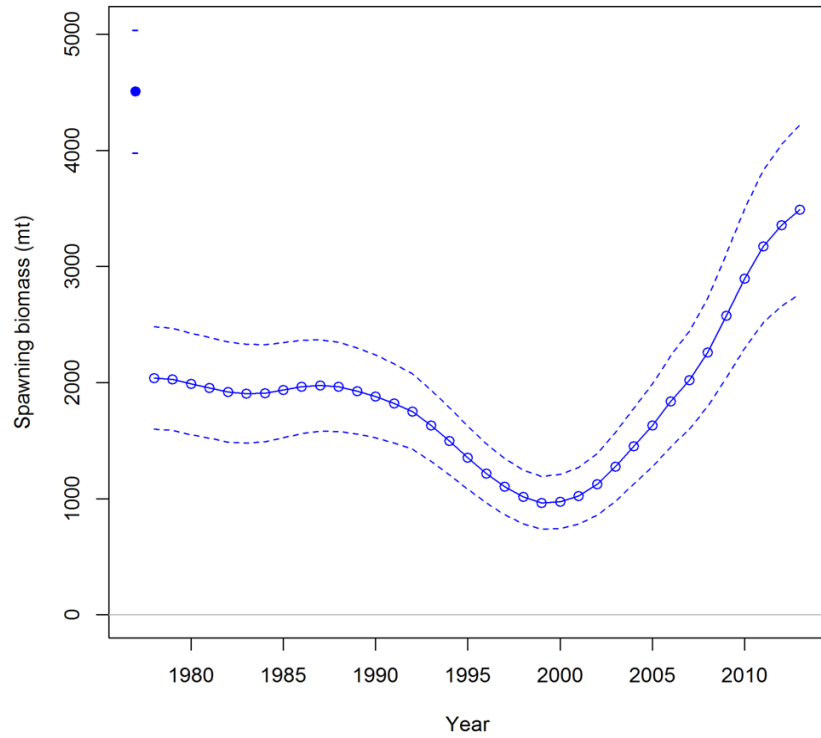# The last thirty years are dominated by recreational fishing
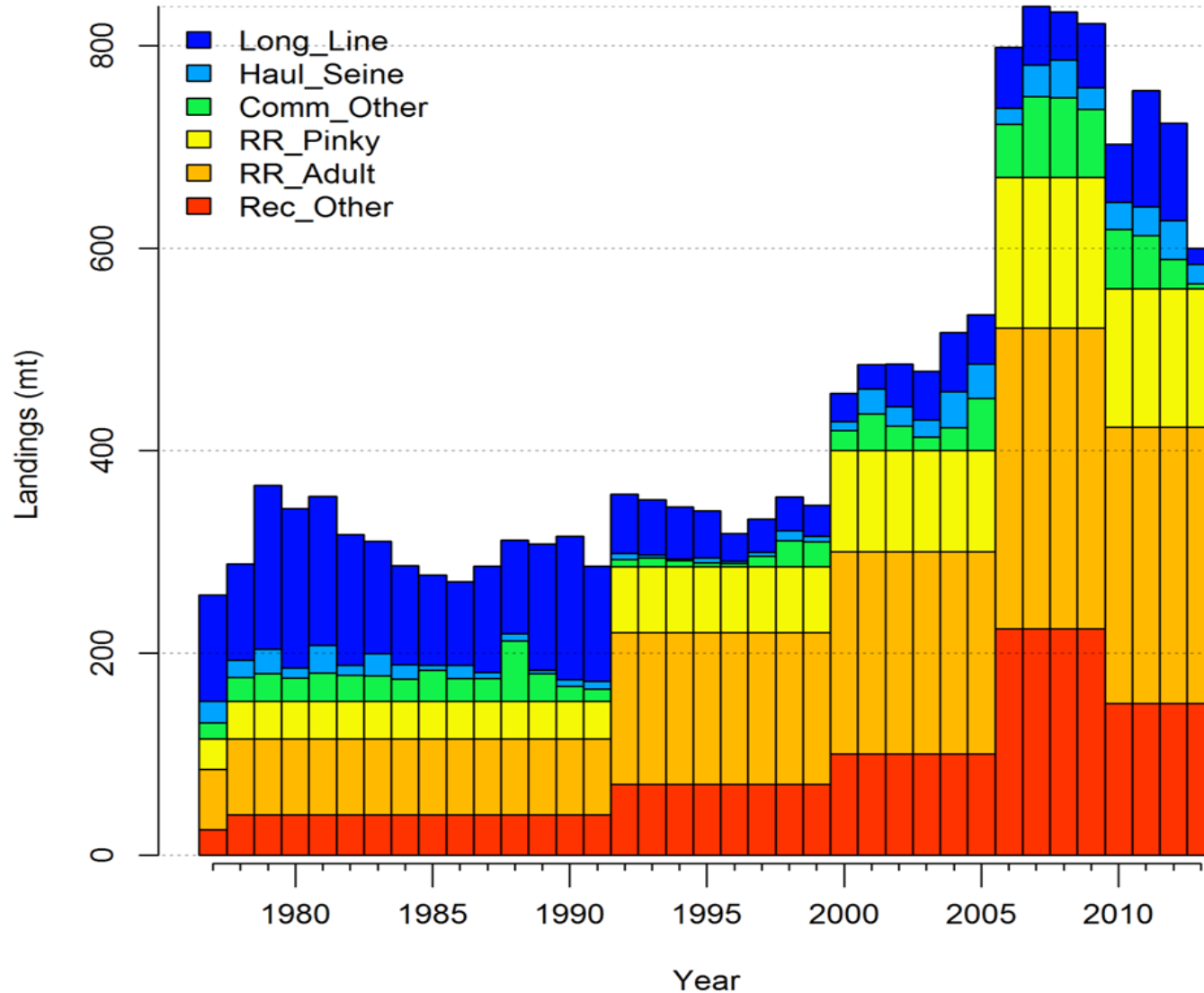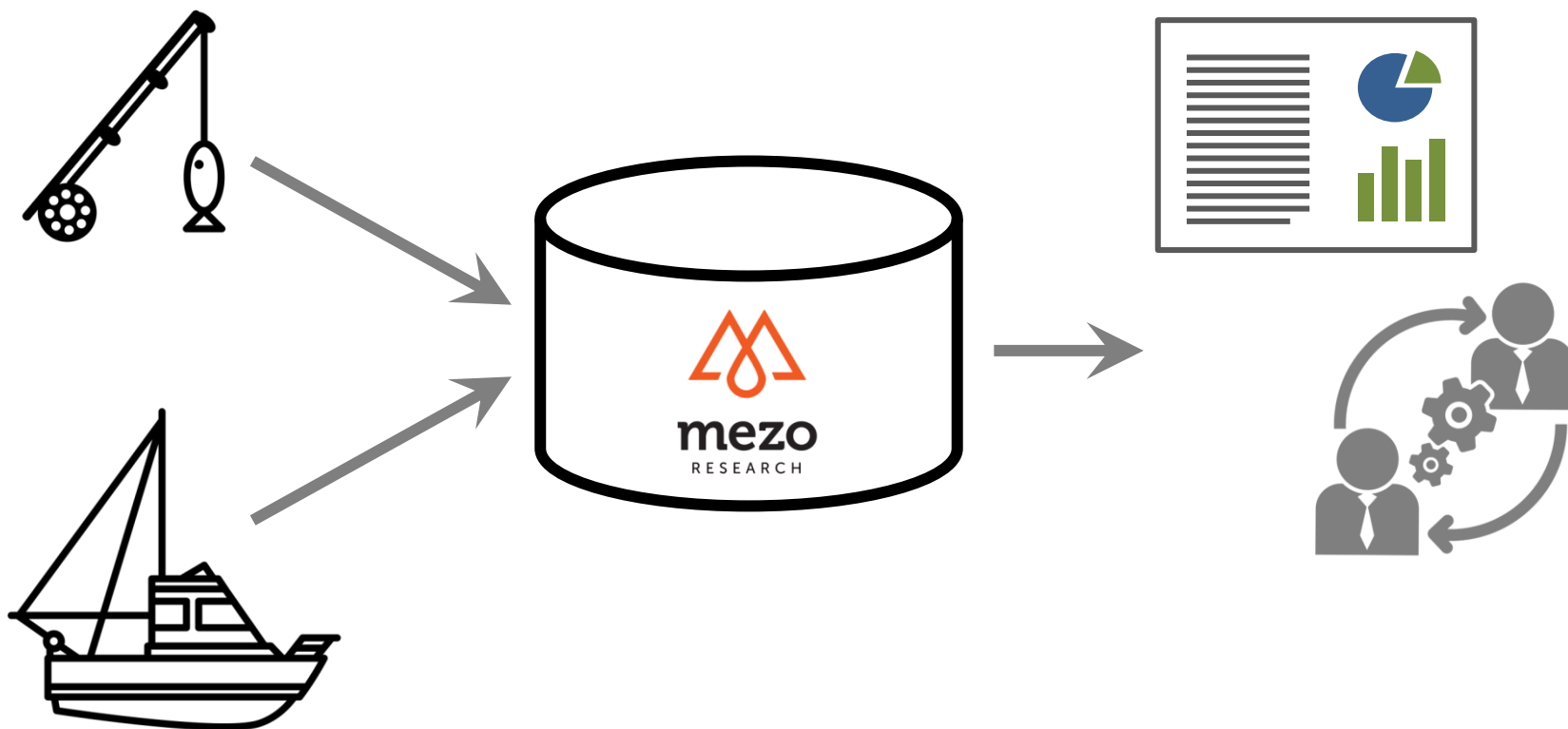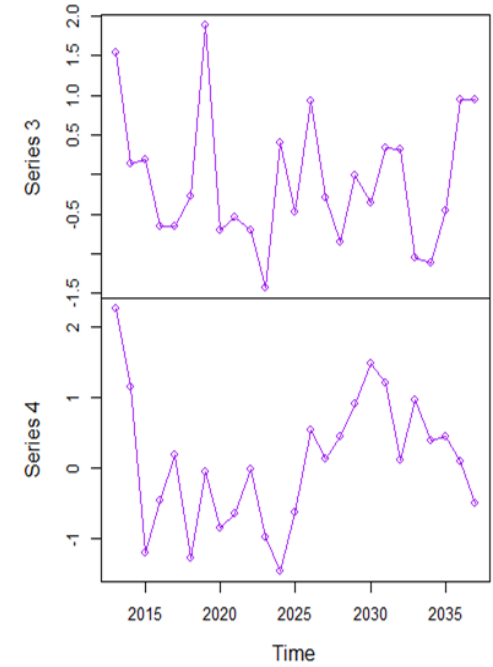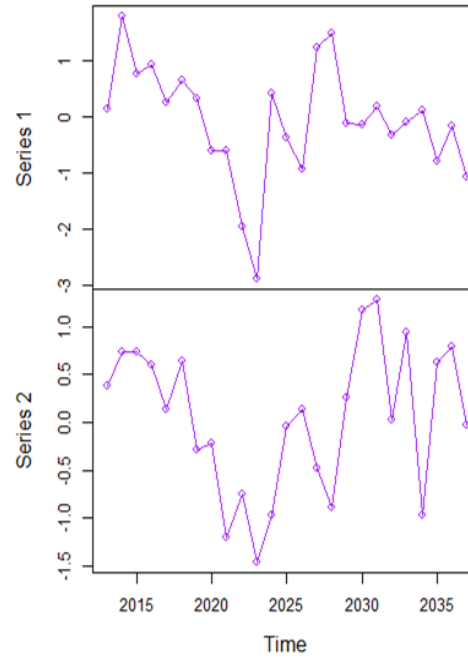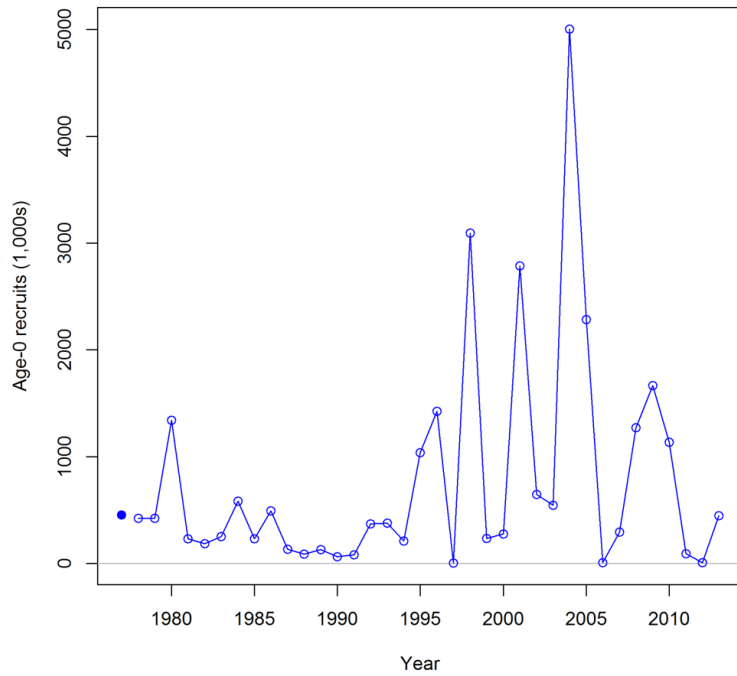
```
  4  //   !!CLASS of stream post("eval.csv")
  5    init_int styr   //start year of the model
  6    init_int endyr  //end year of the model
  7  // Data stuff only from here
  8    init_int nirec       //number of initial recruitments to estimate
  9    init_int nlenm       //number of length bins for males in the model
 10    init_int nlenf       //number of length bins for females in the model
 11    init_int nr          //number of length bins for recruits
 12    init_number slt      //length interval (mm)
 13    init_number ilen1    //minimum length (mm)
 14    init_int nobs_fish   //number of years of fishery retained length data
 15    init_ivector yrs_fish(1,nobs_fish) //years when have fishery retained length data
 16    init_vector nsamples_fish(1,nobs_fish) //nsamples weight for fish length comps needmatrix each year
 17    init_int nobs_fish_discf  //number of years of fishery female discard length data
 18    init_ivector yrs_fish_discf(1,nobs_fish_discf) //years when have fishery discard length data
 19    init_vector nsamples_fish_discf(1,nobs_fish_discf) //nsamples weight for disc. female length comps
 20    init_int nobs_fish_discm  //number of years of fishery male discard length data
 21    init_ivector yrs_fish_discm(1,nobs_fish_discm) //years when have fishery discard length data
 22    init_vector nsamples_fish_discm(1,nobs_fish_discm) //nsamples weight for disc. male length comps
 23    init_number nobs_trawl                      //number of years of trawl bycatch length data
 24    init_vector yrs_trawl(1,nobs_trawl)          //years when have trawl bycatch data
 25    init_matrix nsamples_trawl(1,2,1,nobs_trawl) //weight for trawl bycatch data
 26  // !!cout<<nsamples_trawl<<endl;
 27    init_number nobs_srv1                       //number of years of biomass data
 28    init_ivector yrs_srv1(1,nobs_srv1)           //years when have biomass estimates
 29    init_matrix nsamples_srv1(1,2,1,nobs_srv1)   //weight for each length comp by sex for length data,female 1 and male 2
 30    init_matrix obs_p_srv1_len_f(1,nobs_srv1,1,nlenm)  //survey length data for female, year then bin
 31    init_3darray obs_p_srv1_len_m(1,2,1,nobs_srv1,1,nlenm)  //survey length data for male,newshell and oldshell, year then bin
 32    init_matrix obs_p_fish_ret(1,nobs_fish,1,nlenm)          //male retained fishery length data
 33  //  init_matrix obs_p_fish_tot(1,nobs_fish_discm,1,nlenm)   //total pot male length data
 34    init_matrix obs_p_fish_discf(1,nobs_fish_discf,1,nlenm)   //female,discard length data
 35    init_matrix obs_p_fish_discm(1,nobs_fish_discm,1,nlenm)   //male,disc.length data
 36    init_3darray obs_p_trawl(1,2,1,nobs_trawl,1,nlenm)        //female and male trawl bycatch data
 37  //   !!cout<<obs_p_trawl<<endl;
 38    init_vector catch_numbers(styr,endyr)                    //retained catch number of crab
```

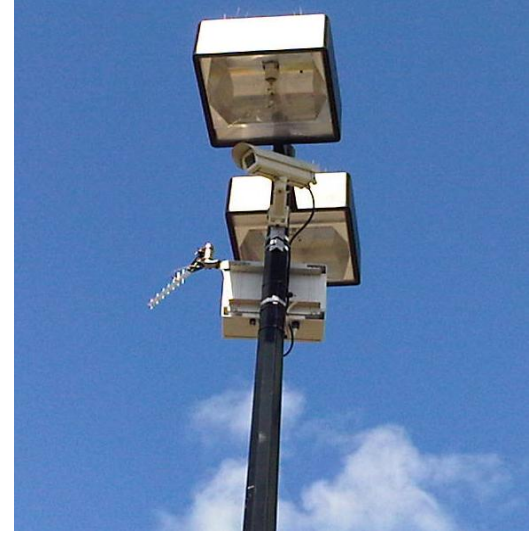# Model estimate of spawning biomass

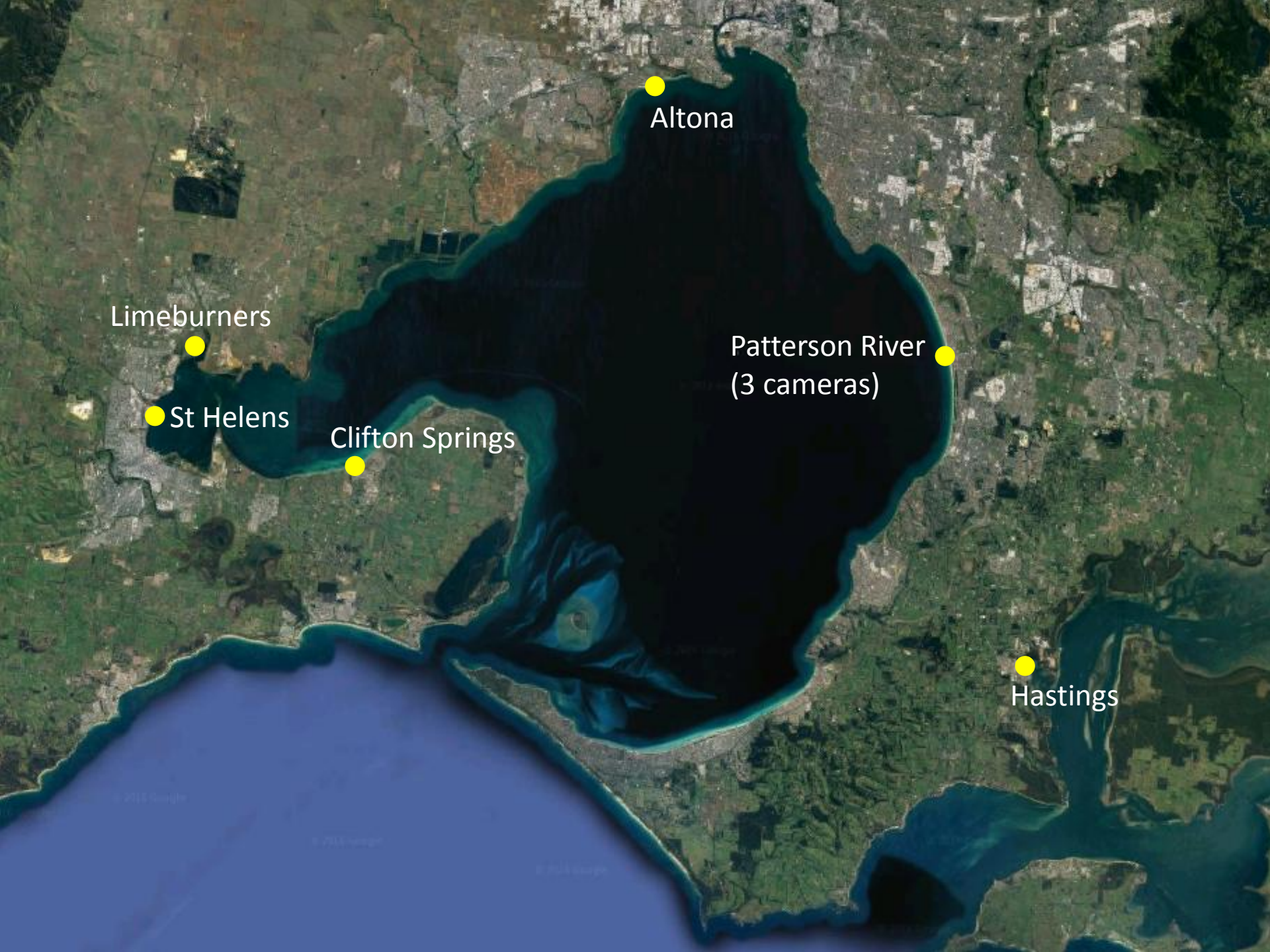# Model simulation of fishing activity

Estimating recreational fishing

- Total recreational fishing effort
  - Fish composition per trip
  - Number of fishing trips
- Good data on catches per trip:
  - Creel surveys
  - Diary anglers
  - Boat ramp surveys
- Need a technique to estimate total number of trips

Fishing vessel launches by hour
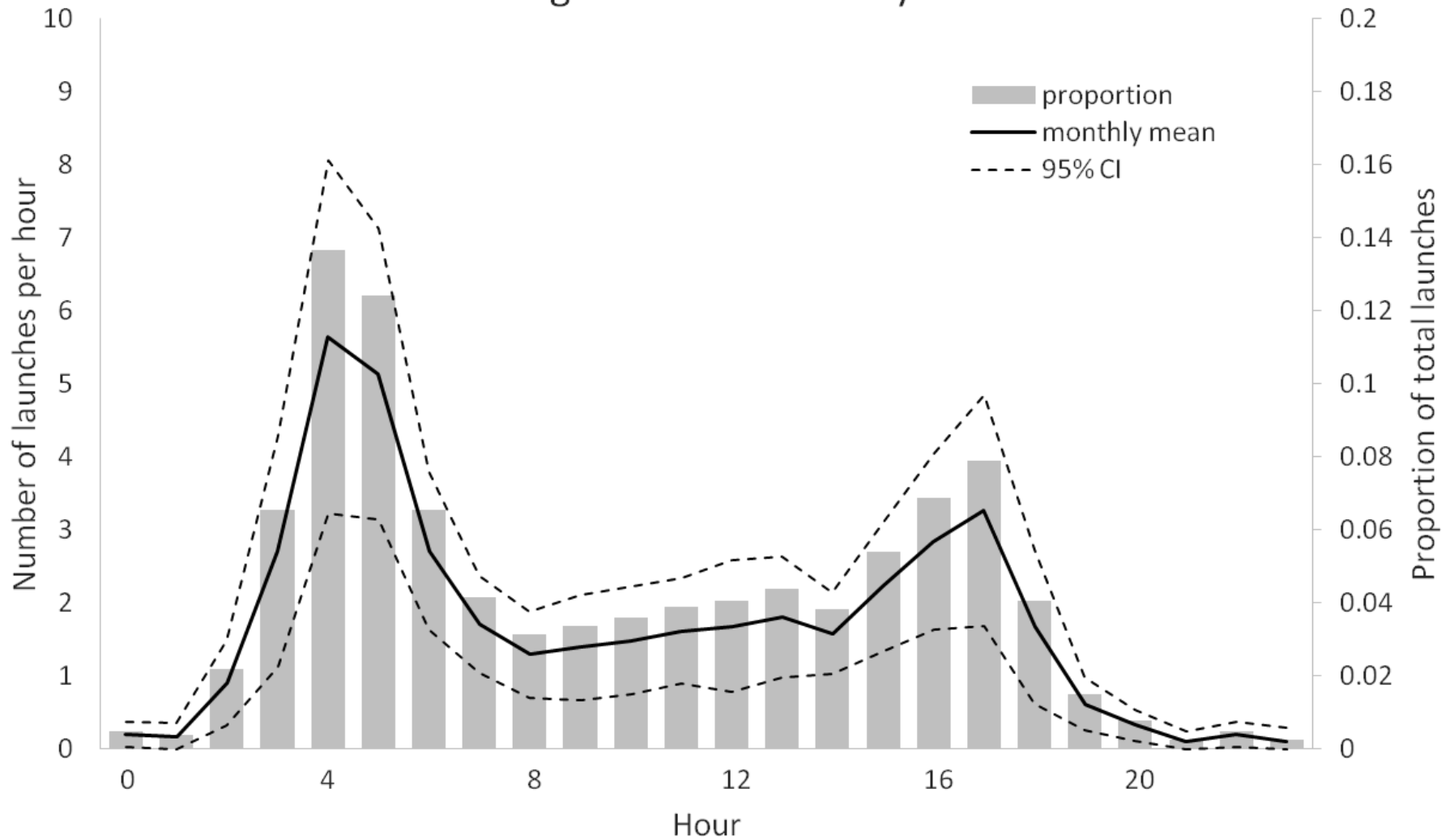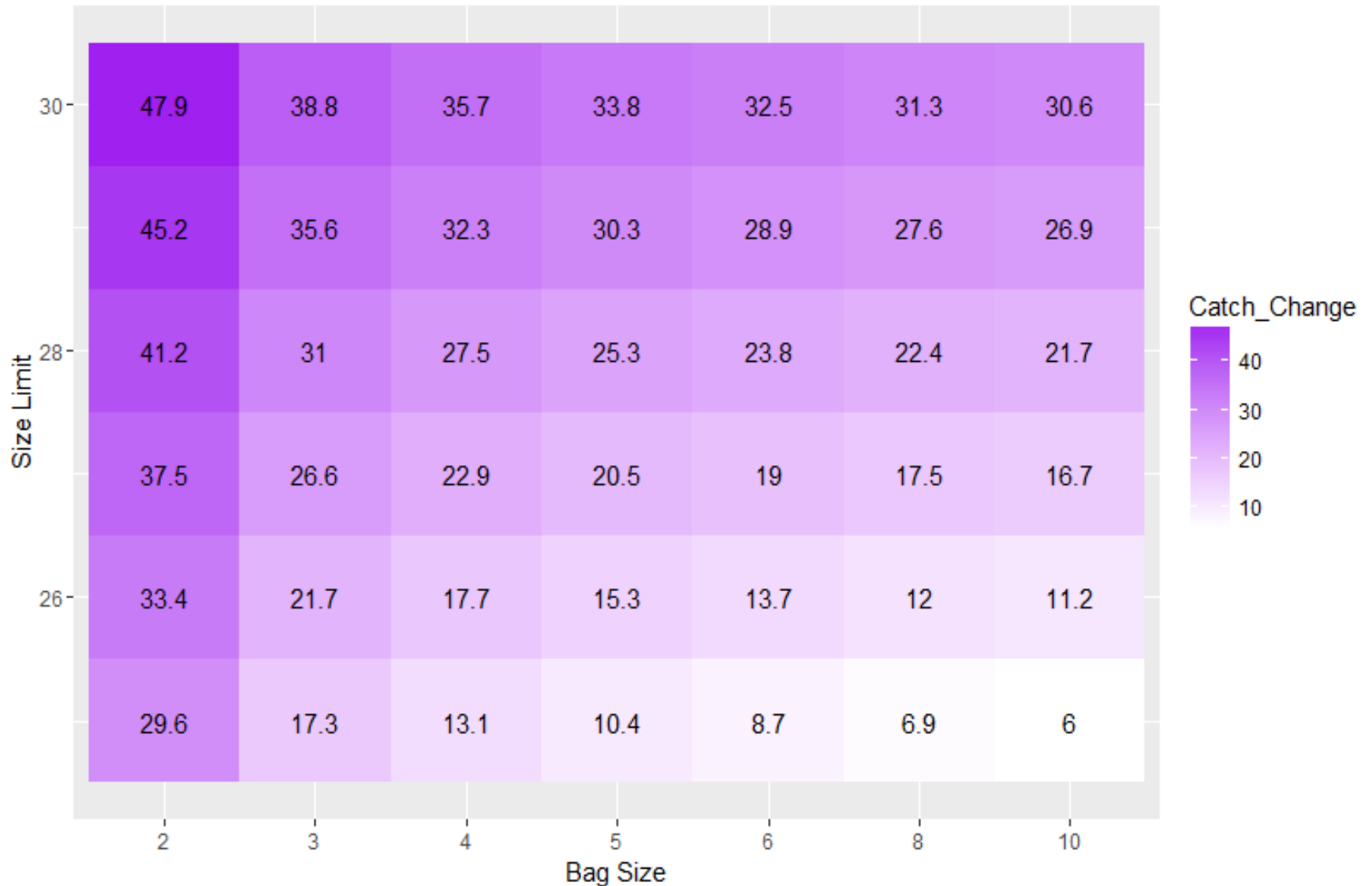
Total Launches by Month
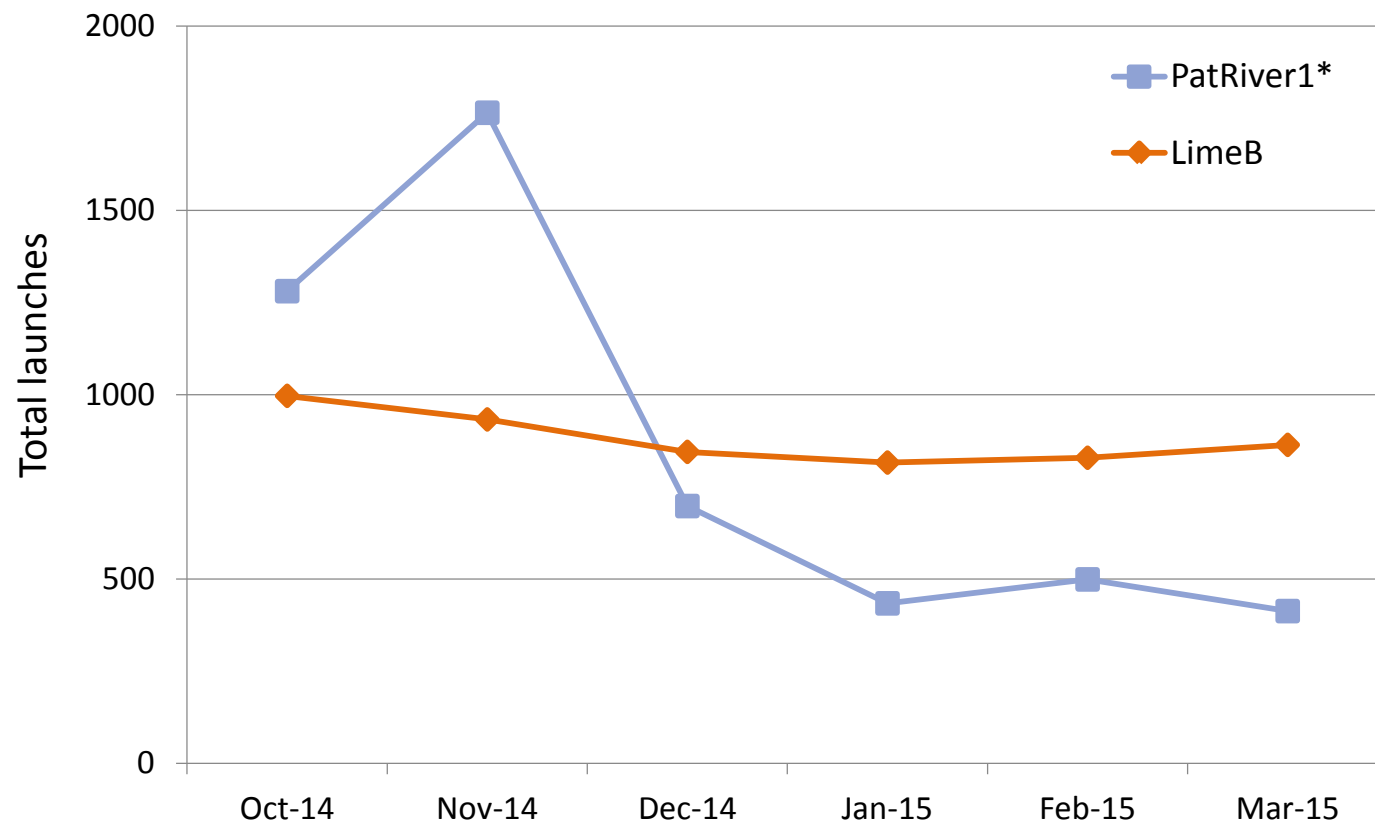
Recreational fishing trips are dominated by catches of <5 fish
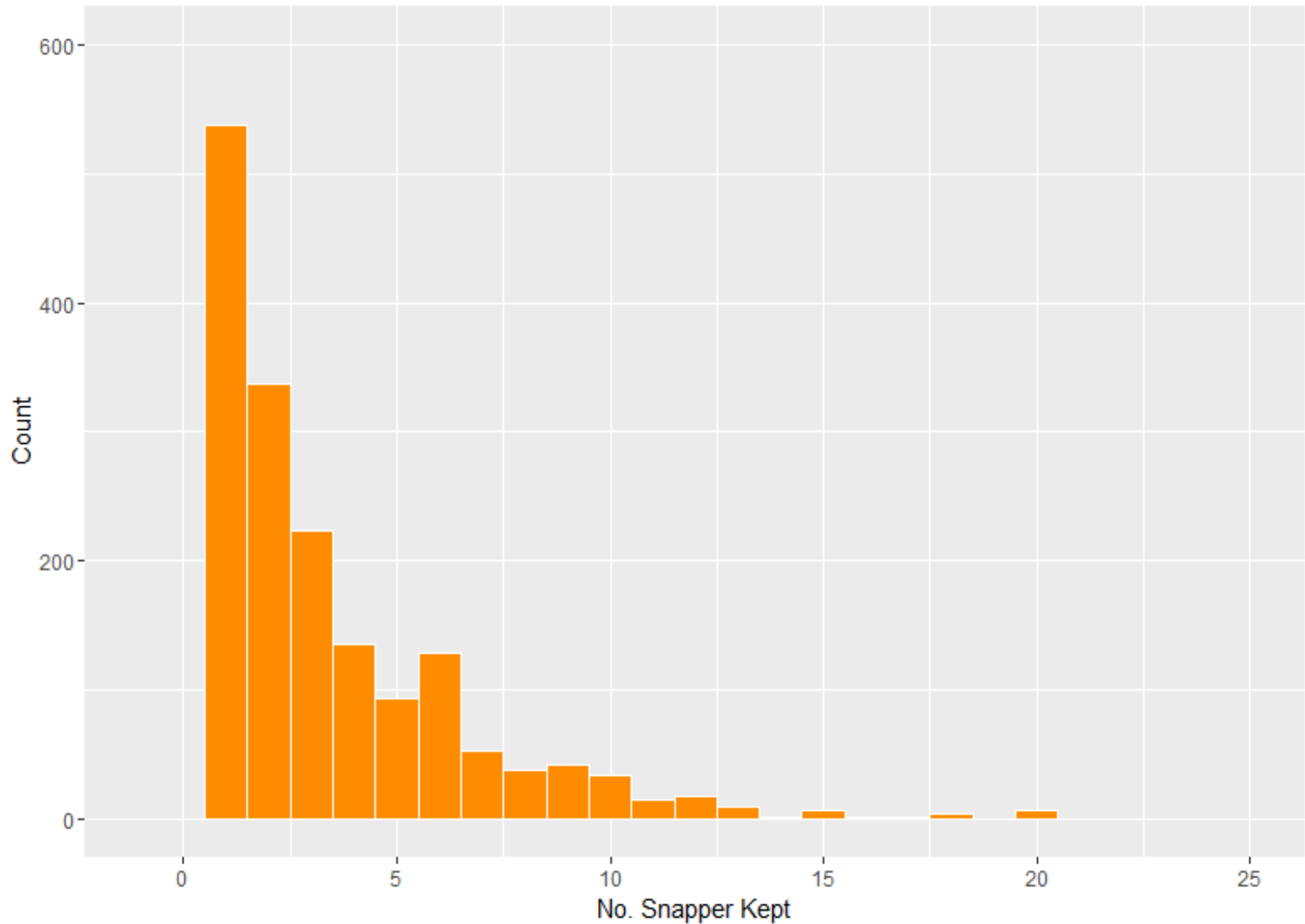
Simple outputs for management decisions aid engagement

Group activity

- Consider a recreational fishery that you are familiar with.

- How is the fishery managed at present?

- Identify what data are currently collected, and how the fishery is being assessed (if at all).

- What are some other ways that the fishery could be managed?

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