Commercial Fisheries Data Collection Improvements in Puerto Rico and the US Virgin Islands

History, Problems, and Recommended Solutions

Puerto Rico DNER
USVI Department of Fish and Wildlife
Caribbean Fishery Management Council
NMFS Southeast Regional Office
NMFS Southeast Fisheries Science Center
MRAG Americas, Inc.

Bob Trumble

40 years of Data Collection

- Puerto Rico data collection in 1967; USVI data collection in 1974
- Commercial data only, some recreational data in PR beginning in 2000
- Landings by individual species submitted on fish tickets in PR
- Landings by species groups submitted on CCRs in USVI
- Port agents collect some species information and lengths

Frustration

- Fishermen and port samplers have collected 40 years of data, but only limited utilization

- Conventional stock assessments attempted 9 times since 2003, but were unsuccessful

- Existing data MIGHT be useful for assessing or setting catch limits for only a few stocks

- Fishermen and managers want to use the data already collected BUT collect more useful data

Current Problems - PR

- Large amount of unreported catch (>50% of landings)

- Port agents do not check reported landings

- Biological Sampling (length, weight, age) does not follow statistical design

- Catch reports not fast enough for in-season management

- Do not have accurate estimate of effort

Current Problems - USVI

- Catch not identified by individual species
- Port agents do not confirm reported landings
- Port agents not able to take enough biological samples (<u>length</u>, weight, age)
- Catch reports not fast enough for in-season management
- Do not have accurate estimate of effort

Timeliness

- One month reporting period in all islands
    - Lag of two to four weeks after end of reporting period before catch is reported
- Want weekly reporting with one week lag after reporting period
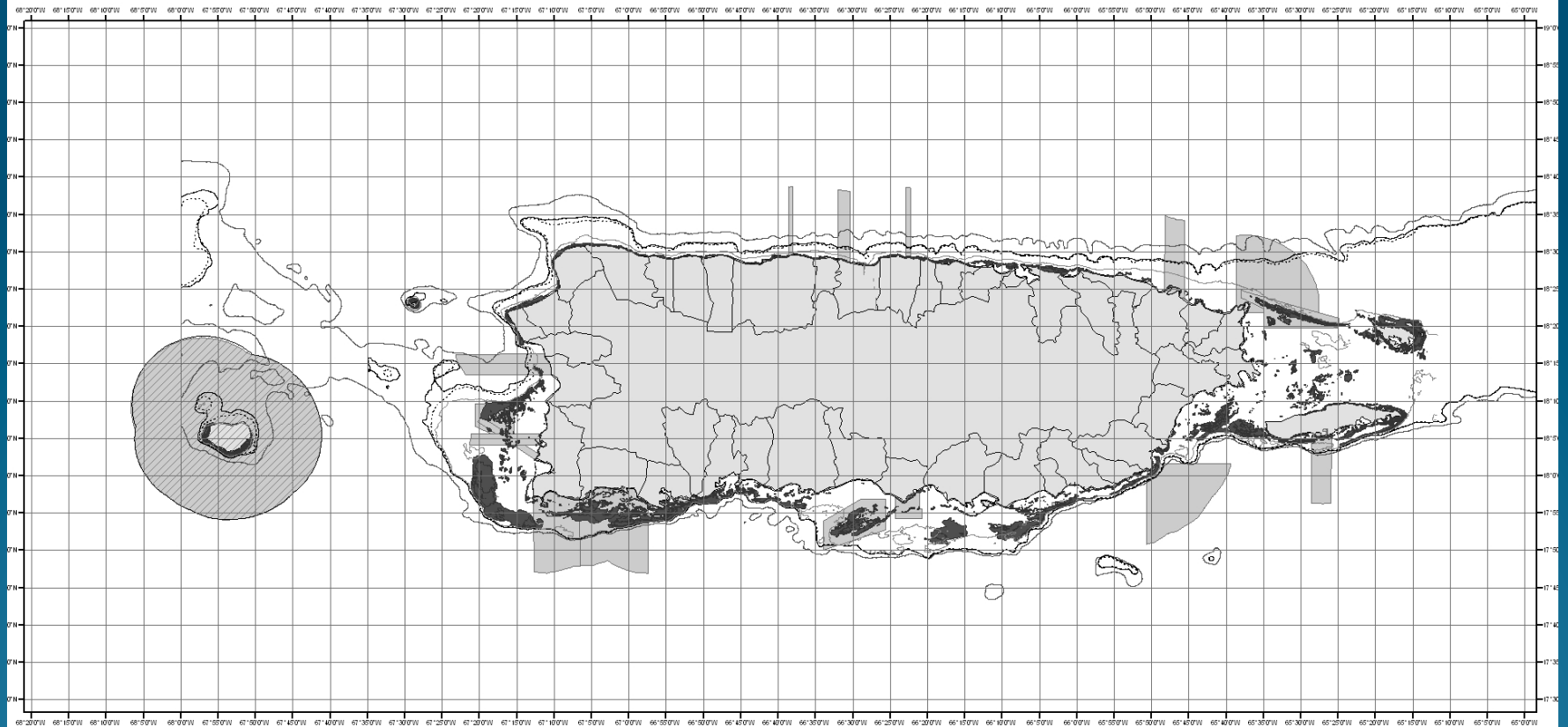- May need to phase in

Catch per Unit Effort

- Need landings of individual species separated by gear
- Need to know where catch occurred
  - Area of coast
  - Grid (2.5 x2.5, 5x5, 10x10)
  - Predominant depth by gear/day
- Specifics for each gear
  - Number of units of gear
  - Mesh Size
  - Soak Time, etc.

Suggested Fishing Location Map (5x5)

Priorities for short term

- Provide management advice for selected species within 2-7 years
  - Intensive length sampling for length-based model
- Enhance industry understanding and engagement
- Report landings by species
- Increase bio-sampling
- Validate landing reports
- Enhance enforcement

Priorities for long term

- Life history sampling
  - Aging, maturation,
  - Fecundity
  - Trophic studies
- Statistical model application
- Periodic evaluation of program design
- Ongoing monitoring
- Maintain sufficient reporting

Objectives for Improvements

- Determine what work we need
- Determine the cost for each component
- Determine the total budget
- Present to SEFSC, SERO, HMS

- Let Governing Agencies obtain the budget
- Adjust the work to the budget

Meeting Schedule

1. Meeting 1: define problem and approach
2. Meeting 2: technical workshops
   - numbers of fishing trips;
   - catch per trip;
   - Length, age, and sexual maturity distributions
3. Meeting 3: sample size and budget

Catch Estimator

Catch = number of trips * catch per trip

- Distribution of trips by gear
- Distribution of species caught by gear
- Distribution of pounds by species by gear

- Estimation by
  - PR: NE, NW, SW, SE
  - USVI: STT-STJ, STX

Considerations for Vessel Counts

<u>Over flights</u>

- Shelf only or extend to offshore
- Preferred for PR
- PR only or add USVI

<u>Ground counts</u>

- Preferred for VI
- Number of ports-centers per sampler

Must match aerial and ground surveys

Gear Strata

- Trap
- Line shelf
- Line offshore
- Line FAD
- Hand harvest (SCUBA, free dive)
- Net (seine, trammel)
- Troll
- Mixed

Catch validation

- 500 samples per year per region
- 50 weeks per year
- =10 samples per week
  - Day – Wed-Sat   3/wk
  - Day – Sun-Tues   2/wk
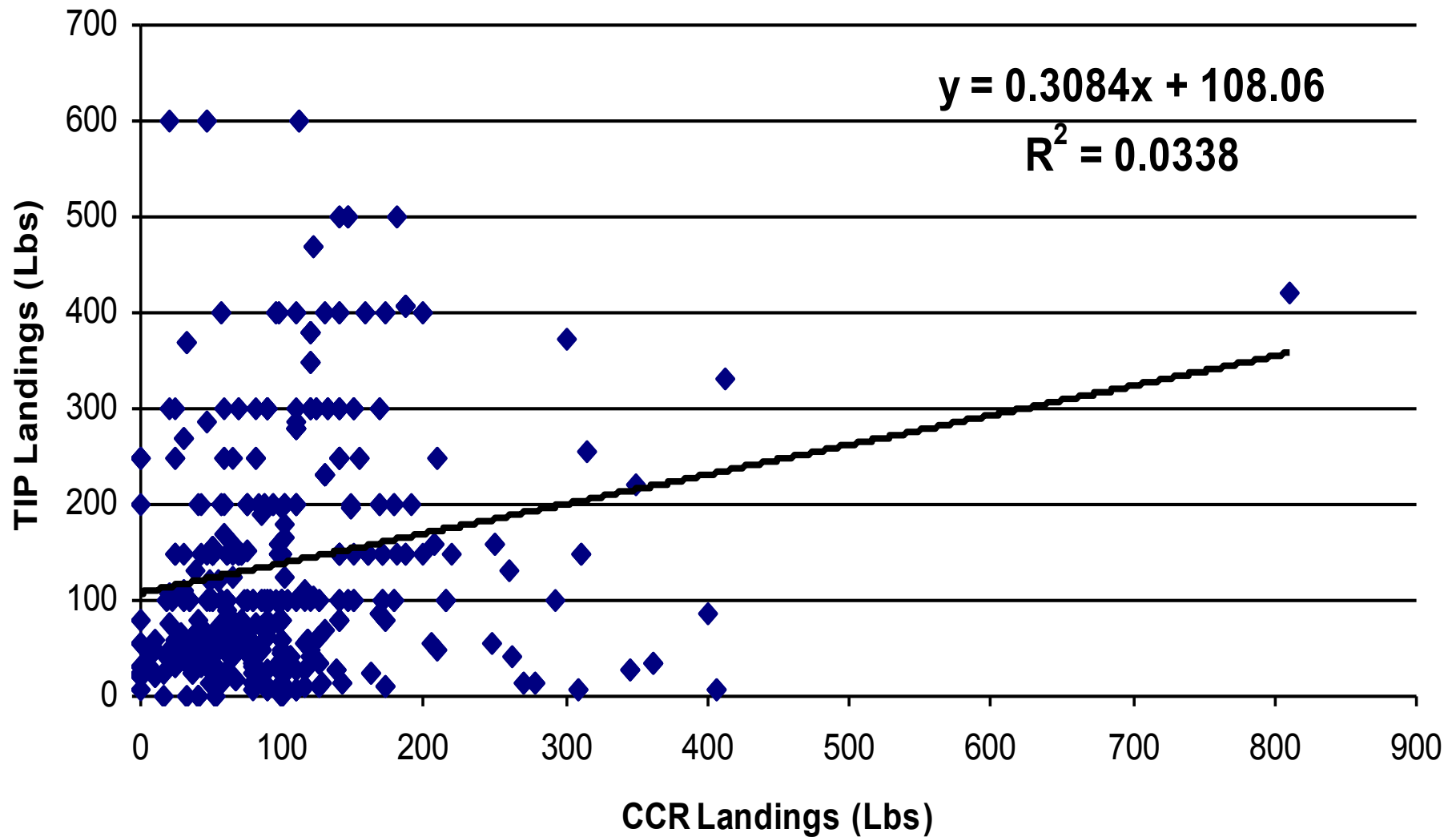 - Night – Wed-Sat   3/wk
  - Night – Sun-Tues 2/wk

Compare Catch Estimate to CCR-FSPT

- Where possible, 1:1 comparisons
- At minimum, composite comparison
- Revised CCR form – USVI
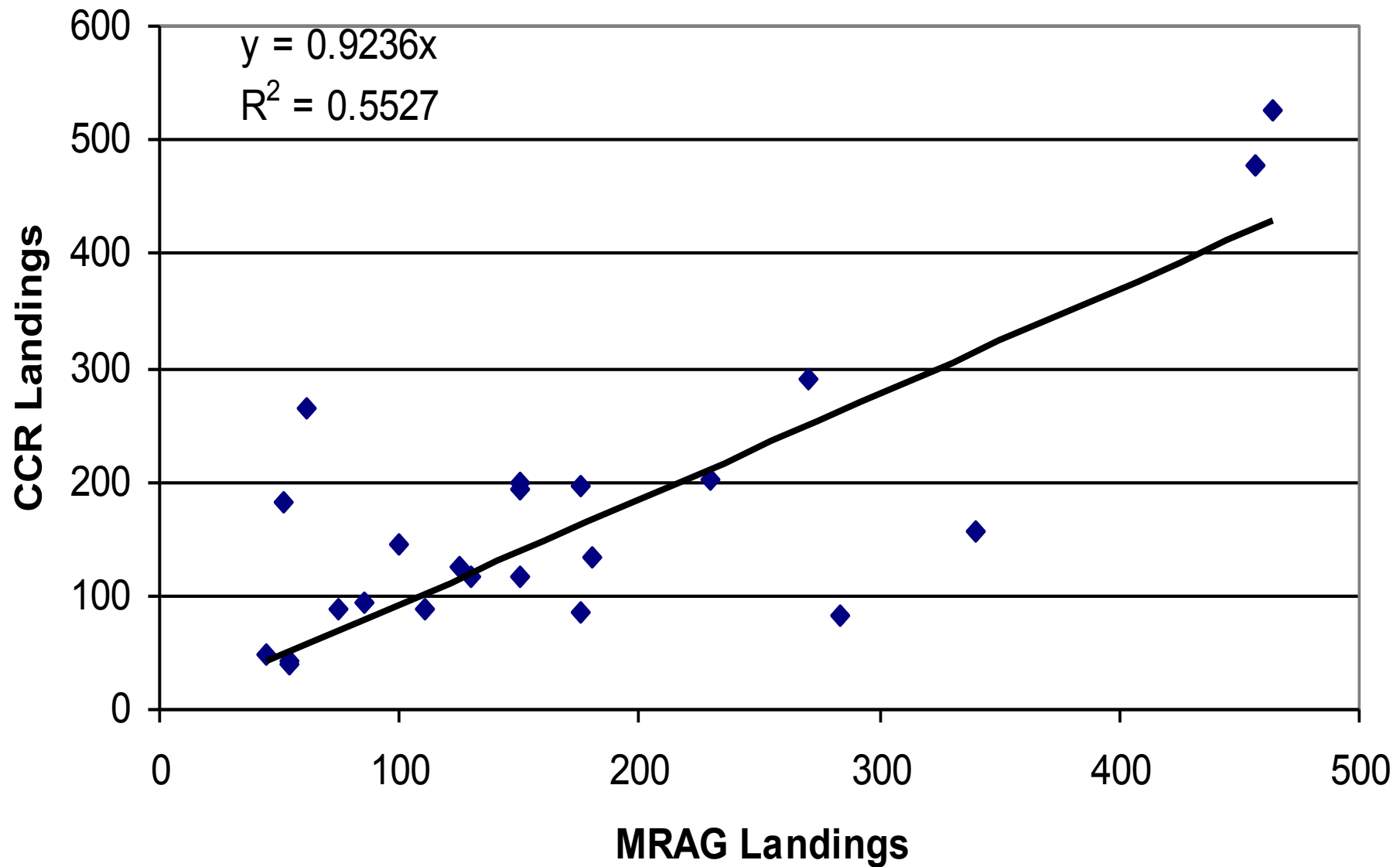- Revised FSPT form – PR
- Fishing location grid maps

TIP/CCR Comparison
(St. Thomas Trap Fishery)

$y = -0.0176x + 79.185$

$R^2 = 0.0003$
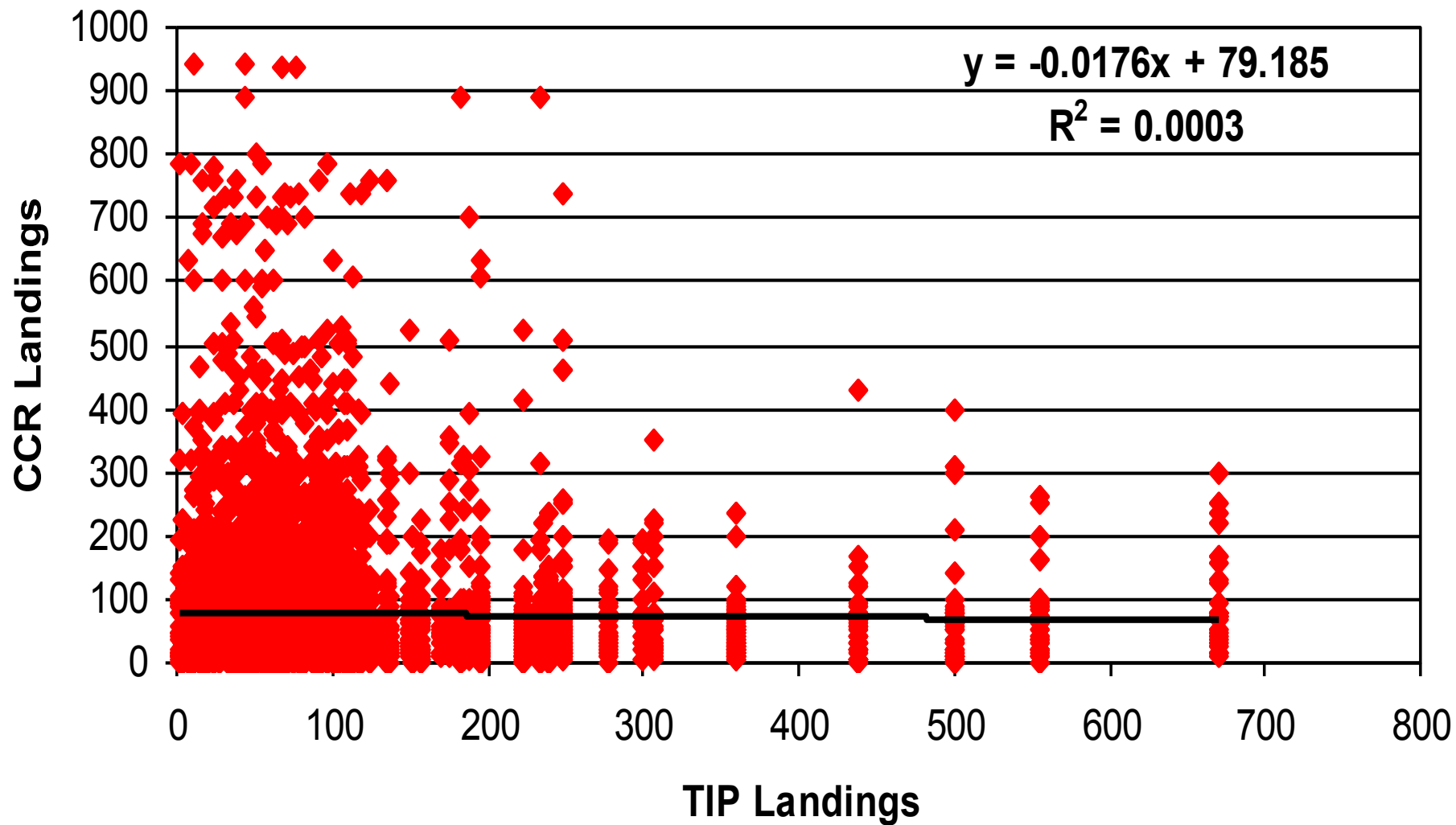
CCR/TIP Comparison
(St. Croix Before 2003)

$y = 0.3084x + 108.06$

$R^2 = 0.0338$

CCR/MRAG Comparison

$y = 0.9236x$
$R^2 = 0.5527$

MARFIN/CCRTotal Landings Fish Traps

$y = 0.9373x$

$R^2 = 0.7247$

CCR (y-axis)

MARFIN (x-axis)
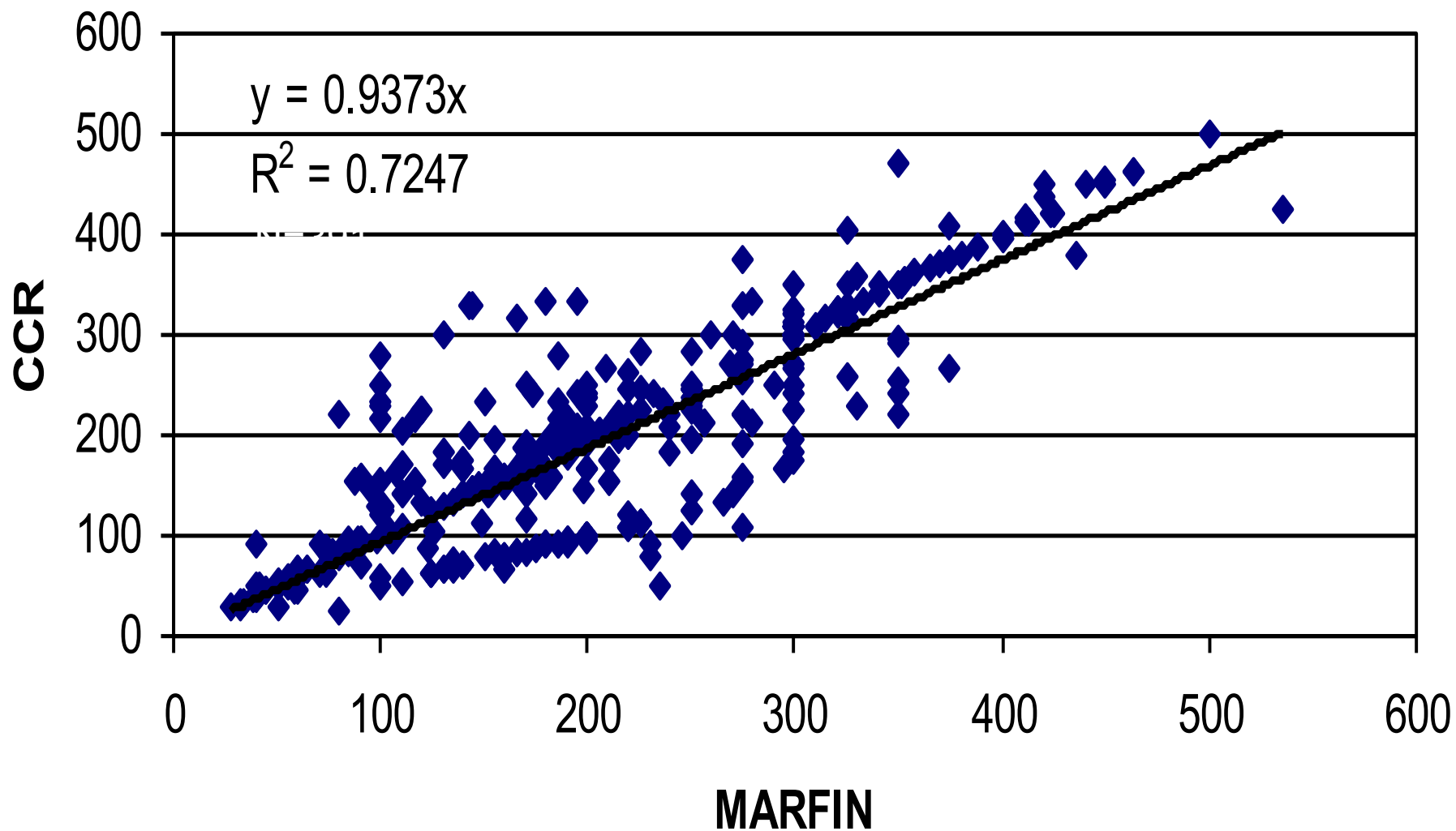
Considerations for Lengths

- Spatially representative
- Temporally specific
- Gear representative?
- Random subsample or all fish?
- Obtain from surveys separate from validation?
- Maturity-age-stomachs from length survey

Gedamke-Hoenig Model

The GH model detects an initial value for total mortality (z_1), the year that a change in total mortality occurred (y_c), and the **new value of total mortality (z_2).**

Use computer simulation to examine effects of sample size needed for future assessments (to estimate z_2)

- **Caribbean SSC and Data Evaluation SEDAR Working Group determined that the Gedamke-Hoenig length-based model (GH model) has the greatest likelihood of producing a viable assessment in the US Caribbean.**

Key Data Collection Elements

Sampling Component		Comments
Catch Reporting Form		Need area, gear
Total Catch Estimation/Catch Report Validation	Trip Counts	Aerial surveys; shoreside counts (docks, ramps)
	Catch Weight Validation	Fisher interviews
Biosamples	Length Samples	Measurements
	Maturity/Age Samples	Buy fish

Oversight

Regional steering committee

- Puerto Rico DNER   GSMFC
- USVI DPNR   SEDAR
- SERO   SEFSC
- Caribbean Council   HMS
- Stakeholders

Plan the science-based projects and review the performance of the projects

Oversight

Sub-regional steering committees USVI and PR

- Science tasks:
  - Catch validation
  - Effort (trip counts)
  - Biological sampling
- Management task
  - Monitor ACLs