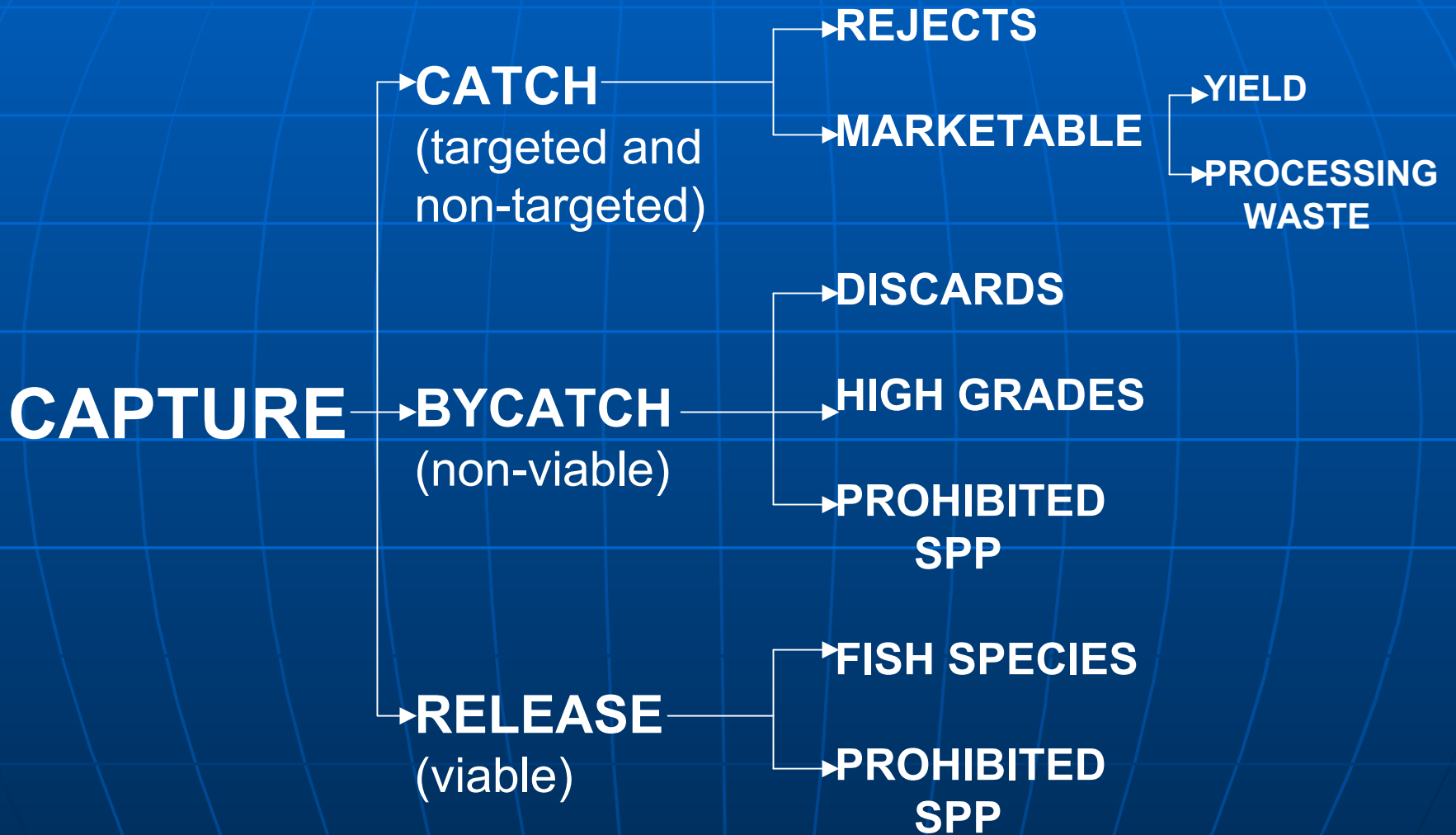


**“ENVIRONMENTAL BAGGAGE”:  
COMPARISON OF HAWAII WITH  
OTHER PELAGIC LONGLINE  
FISHERIES**

**Paul Bartram  
John Kaneko  
PacMar Inc.**

# DEFINING “BYCATCH”

- MAGNUSON-STEVENS ACT:
  - PORTION OF CATCH “NOT USED”
  - IF RELEASED ALIVE.....
    - IN COMMERCIAL FISHING = BYCATCH
    - IN RECREATIONAL FISHING = NOT BYCATCH
  
- OTHER:
  - NON-TARGET CATCH
  - OFTEN HAS ECONOMIC VALUE – NOT WASTED
  
- MARTIN HALL (IATTC)
  - BYCATCH = “WASTE”
  - RELEASED AT SEA DEAD OR MORTALLY INJURED



Based on definitions of Martin Hall (1996)

# BYCATCH to CATCH RATIOS

- $BPUE/CPUE = BYCATCH/CATCH$  RATIO
- CONCEIVED BY MARTIN HALL
- IN THIS STUDY:
  - SEA TURTLE TAKES/MT TARGET CATCH
  - FISH DISCARDS /MT TARGET CATCH
- FISH SOLD BY WEIGHT

# IS PELAGIC LONGLINING A “CLEAN OR DIRTY” FISHING METHOD?

- SPC:
  - “RELATIVELY ENVIRONMENTALLY FRIENDLY”
- KEN HINMAN (1998):
  - “...LAYING AN UNDERWATER MINEFIELD”
- CROWDER and MYERS (research proposal):
  - “... ONE OF THE MOST LUCRATIVE AND DESTRUCTIVE FISHERIES IN THE WORLD”

# PELAGIC LONGLINE METHODS ARE NOT CREATED EQUAL

- LONGLINING NOT ONE METHOD
- IMPACTS VARY WITH PRACTICES
- KEY IS WHERE HOOKS ARE SET IN RELATIONSHIP TO THE HABITAT AND DISTRIBUTION OF TARGET AND NON-TARGET SPECIES.

# TYOLOGY OF LONGLINE METHODS

- LONGLINE FISHERIES PROFILED:
- PACIFIC OCEAN
  - AUSTRALIA
  - CALIFORNIA
  - CHINA
  - HAWAII
  - JAPAN
  - TAIWAN
  - MEXICO
  - CENTRAL, SOUTH AMERICA
- ATLANTIC OCEAN
  - BRAZIL
  - SOUTH AFRICA
- ALL SUPPLY U.S. FRESH PELAGIC MARKETS

# CRITICAL FACTOR – HOOK DEPTH

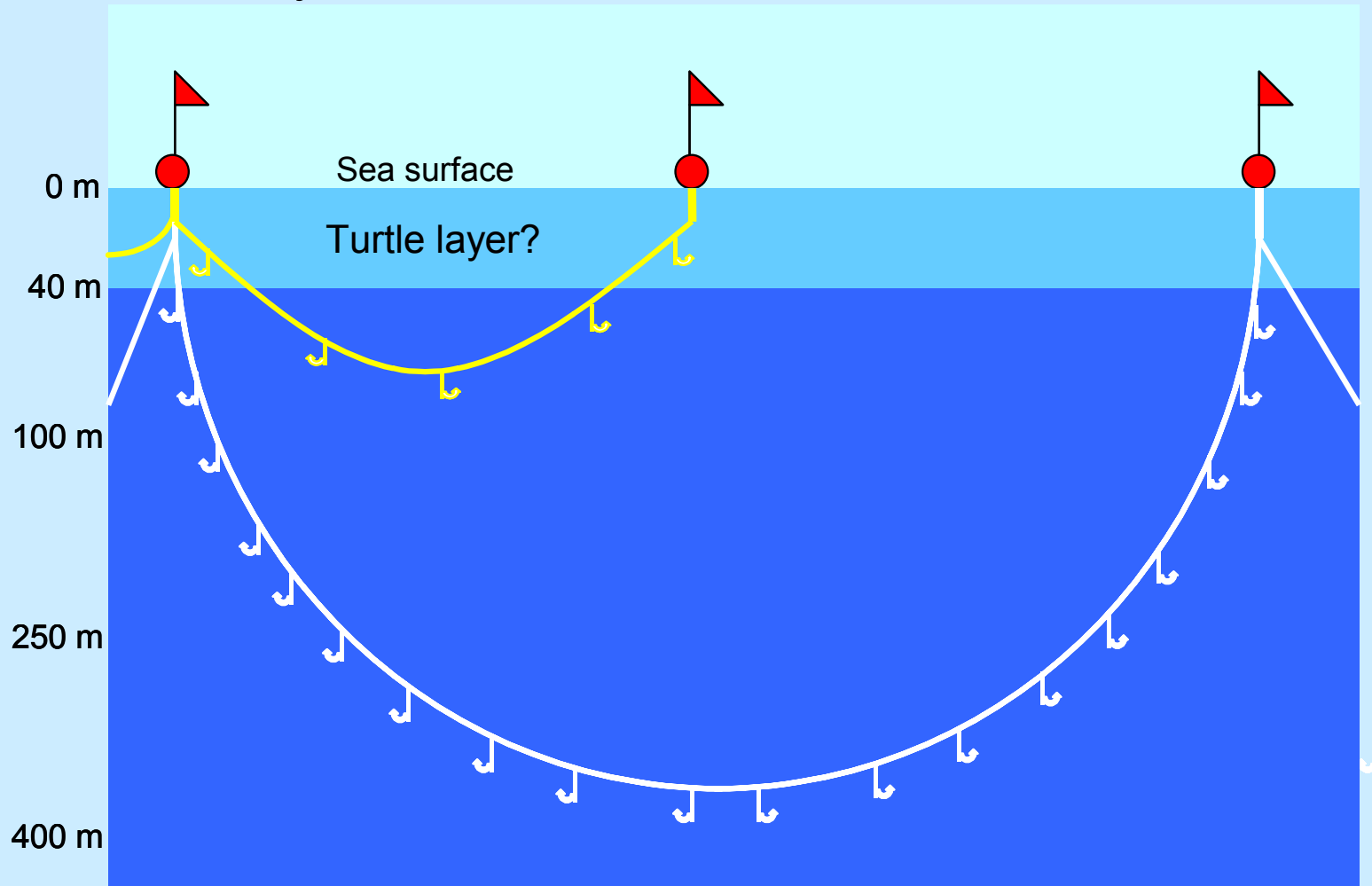
## ■ DEEP SET

- TUNA TARGET: Hawaii, Japan

## ■ SHALLOW SET

- SWORD TARGET: Mexico, South Africa, California, Hawaii
- TUNA/BILLFISH: Australia, China, Taiwan
- TUNA/BILLFISH/SHARK/MAHI: Central and South America
- 10X MORE TURTLE TAKES THAN DEEP SETS.

# Comparison of deep-set and shallow-set pelagic longline gear in relationship to the proposed “sea turtle layer”.



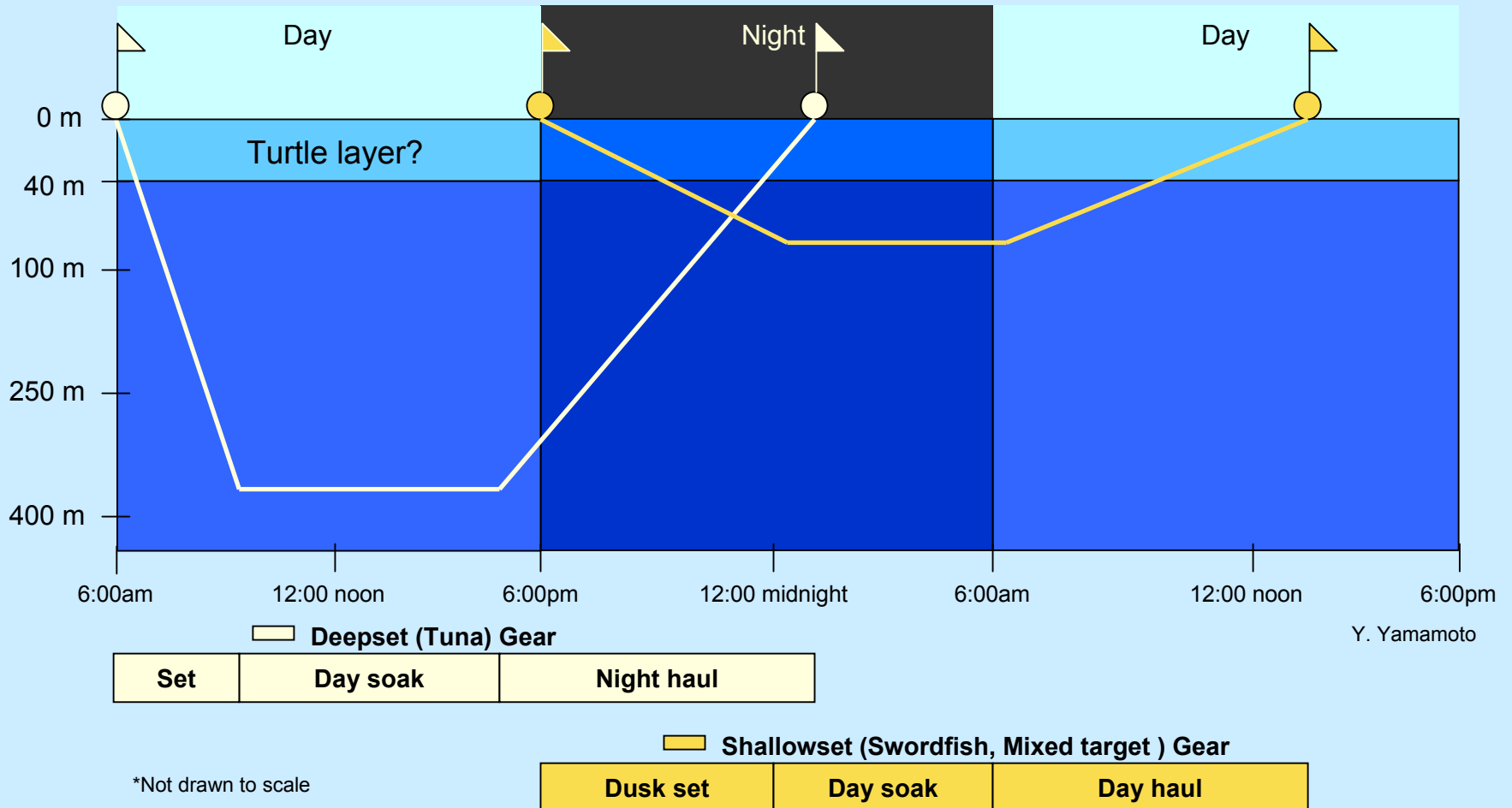
\*Not drawn to scale

Y. Yamamoto

<sup>1</sup>Yellow = shallow-set longline gear (Hawaii-swordfish, Taiwan-tuna, PR China-tuna, eastern Pacific-mixed)

<sup>2</sup>White = deep-set longline gear (Hawaii-tuna, Japan-tuna)

# Conceptual diagram contrasting deep-set and shallow-set pelagic longline fishing methods: time of setting, soaking and hauling.



# TURTLE TAKES/TARGET CATCH

## TURTLE TAKES / 100 MT TUNA (DEEP SET)

- JAPAN, HAWAII (tuna) = 2 TURTLES/ 100 MT TUNA

## TURTLE TAKES / 100 MT MIXED SPP (SHALLOW SET)

- CENTRAL AND WESTERN PACIFIC

- AUSTRALIA = 7 TURTLES/ 100 MT

- HAWAII (sword) = 15 TURTLES/ 100 MT

- CHINA, TAIWAN = 19 TURTLES/ 100 MT

- EASTERN PACIFIC

- COSTA RICA = 19 – 1,450 TURTLES/ 100 MT

- ATLANTIC

- BRAZIL = 2,320 TURTLES/ 100 MT

# MT FISH BYCATCH/TARGET CATCH

- JAPAN (DEEP SET)
  - 0.37 MT BYCATCH/ MT TARGET CATCH
- CHINA, TAIWAN (SHALLOW SET)
  - 0.9 MT BYCATCH/ MT TARGET CATCH

# “TRANSFERRED EFFECTS”

- “*ENVIRONMENTAL BAGGAGE*”
- INDIRECT EFFECT OF REGULATION
  - PRODUCTION TRANSFERRED EFFECTS,  
ex. shift of Hawaii fishing effort to the east
  - MARKET TRANSFERRED EFFECTS,  
ex. replacement of lost Hawaii supply with  
product from alternative fisheries.

# TRANSFER OF EFFORT

- Production Transferred Effect.
- When Hawaii Swordfish Longlining was prohibited in mid-2001.....
- Most of Hawaii swordfish fleet simply moved to eastern Pacific.

# TURTLE TAKES ALSO TRANSFERRED

WHEN HAWAII BOATS MOVED EAST  
OF 150 W.....

- TURTLE TAKE RATE REMAINED APPROXIMATELY THE SAME.
- 1.5 TURTLE TAKES/10,000 HOOKS
- NO NET BENEFIT

# MARKET TRANSFERS

- Market Transferred Effect
- U.S. buyers forced to replace Hawaii swordfish.
- Fleets (“sources”) that filled Hawaii’s market niche include:
  - CALIFORNIA
  - MEXICO
  - COSTA RICA, PANAMA
  - SOUTH AFRICA

# EFFECT ON TURTLE TAKES

- REPLACEMENT SWORDFISH FROM:
  - MEXICO, CENTRAL AMERICA
    - 3-100 TIMES HIGHER RATE OF TURTLE TAKES/MT SWORDFISH THAN HAWAII (shallow gear set closer to nesting aggregations?)
    - HIGHEST TURTLE TAKE RATE WHEN TARGETING SHARK, MAHIMAHI (very shallow gear set near nesting aggregations?)
  - SOUTH AFRICA?

# CAN THE U.S. MARKET “SAVE” TURTLES?

- BUYING HAWAII SWORD LESS DAMAGING IN TERMS OF TURTLE TAKES/TON OF PRODUCT
- U.S. CONSUMERS CAN EXERT PRESSURE TO ENCOURAGE/SUPPORT TURTLE “SAFE” FISHING AND PRODUCTS
- BUT FREE MARKET ECONOMY WILL NOT NECESSARILY REDUCE GLOBAL TURTLE TAKES