AIS-HACCP

Aquatic Invasive Species–Hazard Analysis and Critical Control Point

# Voluntary Aquatic Invasive Species Prevention Verification for Aquaculture and Baitfish Sectors in the Great Lakes Region?

Great Lakes Panel Update

November 3, 2016

Sea Grant

NCRAC

MICHIGAN STATE UNIVERSITY

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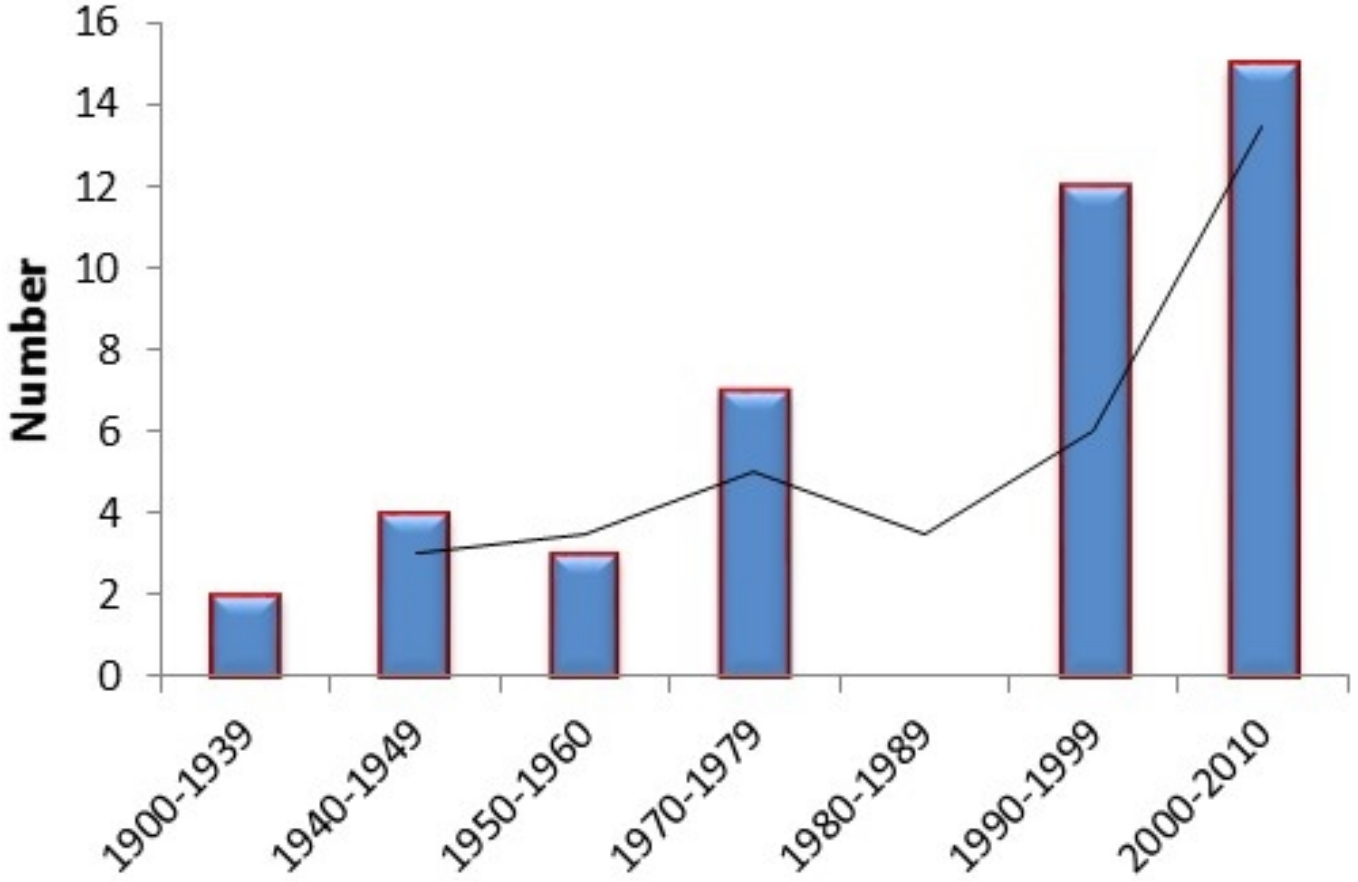
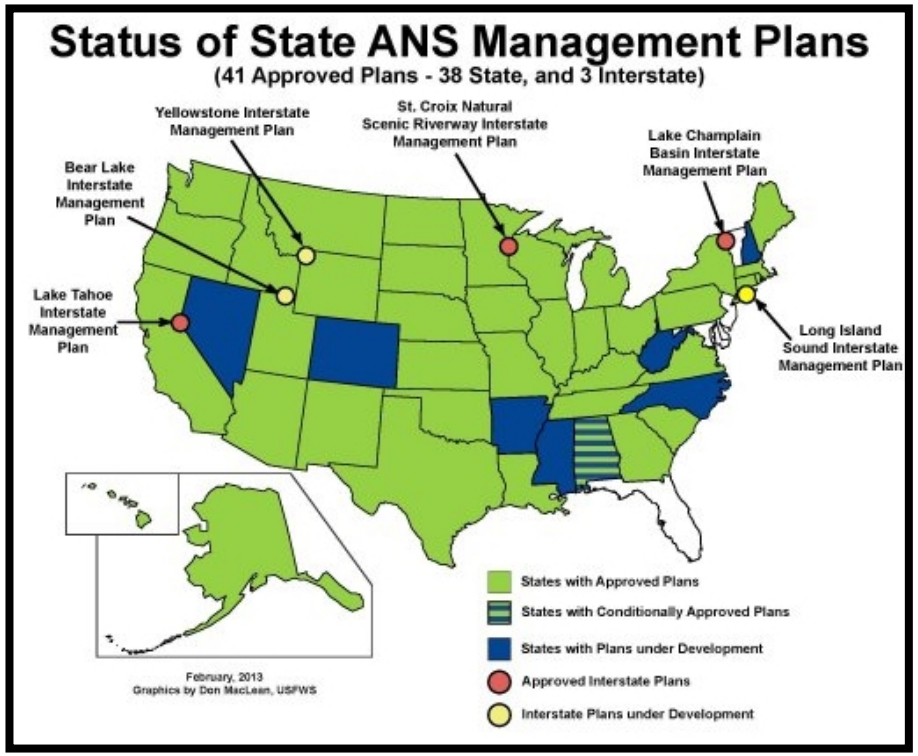
North Central Region US

# Trends in Federal Regulations in Great Lakes



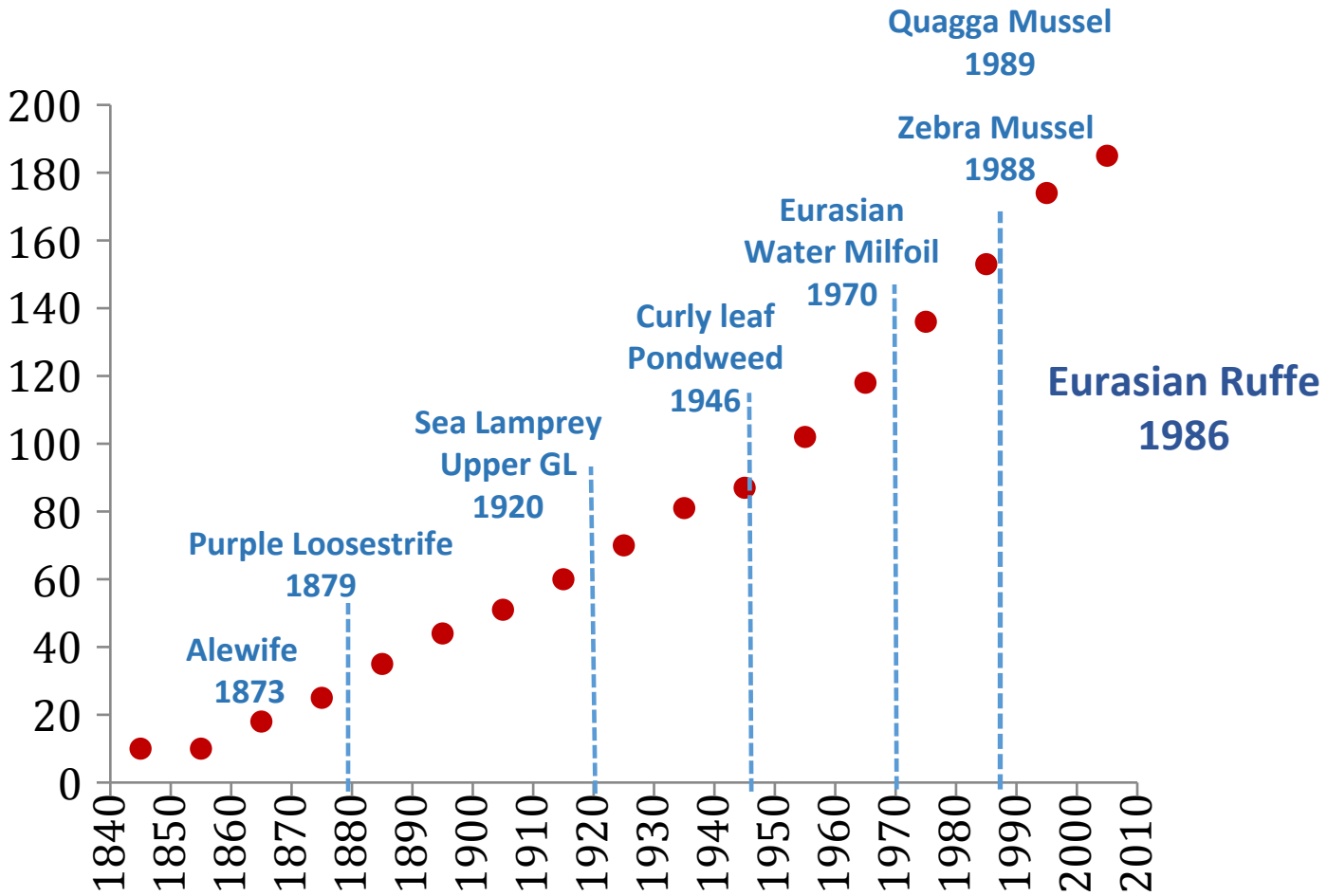

# State / Tribal Laws?



# Trends in Commercial Aquaculture and Baitfish Sectors

- Seeking recognition for AIS prevention
  - Best Management Practices
  - Biosecurity Plans
  - Certifications
  - AIS HACCP

# Trends in NIS Introductions in Great Lakes




Source: NOAA

AIS-HACCP

Aquatic Invasive Species–Hazard Analysis and Critical Control Point

AIS-HACCP: Aquatic Invasive Species - Hazard Analysis and Critical Control Point Training Curriculum Program

By Jeffrey L. Gunderson, Ronald E. Kinnunen


- **H**azard **A**nalysis and **C**ritical **C**ontrol **P**oint

- Based on the principles of Seafood HACCP (National Seafood HACCP Alliance 1997) to ensure safe processing and importing of fish and fishery products.

AIS-HACCP

Aquatic Invasive Species–Hazard Analysis and Critical Control Point

AIS-HACCP: Aquatic Invasive Species - Hazard Analysis and Critical Control Point Training Curriculum Program

By Jeffrey L. Gunderson, Ronald E. Kinnunen


- Objectives:

1) identify and concentrate on critical process control points to ensure environmental safety

2) minimize risks associated with aquaculture and baitfish activities

3) stress communication between regulators and industry

# AIS-HACCP SAMPLE PLAN ONE

**Aquatic Invasive Species – Hazard Analysis and Critical Control Point**

**Product/Procedure Form**

## Product/Procedure Description

| | |
|---|---|
| Organization info | Organization name: Department of Waters and Lands |
| | Address: 123 Main Street City: Capital City State: NY Zip: 11111 |
| (if applicable): | Fish species: Forage fish assessment |
| Harvest, production, management, research, or enforcement activity: | Activity: Trawling |
| Method of transportation, distribution and storage of fish, gear, boats, etc.: | Methods: Boat & gear trailered to public landing sites. Fish are captured with a trawl for assessment, then released. No fish are brought back to the office. Sometimes more than one lake is sampled per day. |
| (if applicable): | Intended use and consumer: N/A |

## Product/Procedure Flow

List the steps involved in the research, management, enforcement, or fish production activity. Only a simple, but complete, description of the procedure is needed. It is important to include all the steps within the control of the agency or business, but use only as many steps as necessary to define your procedure.

| | |
|---|---|
| ① | Agency biologists launch their research boat on Lake Ono and conduct fish sampling using a standard trawl net at two offshore stations. |
| ② | After those two sampling runs, boat is trailered to another lake where they sample fish with trawls. The journey between the two lakes takes approximately 2 hours. |
| ③ | Fish sampling efforts are continued on the second lake, Lake Bono, with the same type of trawl net at two different locations. |
| ④ | After the 2 sampling sessions, the boat is driven back to the original on-land secure storage facility. |
| ⑤ | |
| ⑥ | |

# AIS-HACCP SAMPLE PLAN ONE

**Aquatic Invasive Species – Hazard Analysis and Critical Control Point**

## Hazard Analysis Worksheet

| 1 Activity | 2 Hazards | 3 | 4 Justification | 5 Control | 6 CCP |
|---|---|---|---|---|---|
| Activity, Harvest or Aquaculture Step (from flow diagram) | Potential AIS hazards introduced or controlled at this step (from potential hazards worksheet) | Are AIS hazards significant? (Yes/No) | Justify your decisions for column 3. | What control measures can be applied to prevent the significant hazards? | Is this step a critical control point? (Yes/No) |
| Work Flow Step (1)<br>At the start of the day agency biologists launch their research boat on Lake Ono and conduct routine fish sampling using a standard trawl net at two offshore stations. | Fish/Other Vert. | No | No AIS fish are found in any lakes typically sampled with this boat and equipment. | Nets and equipment should be inspected and fish removed before sampling as a precaution. | No |
| | Invertebrate *Cercopagis pengoi* | No | Ono was the first recorded site for this species. It has been present in Ono for 4 yrs. | | No |
| | Plant Eurasian Watermilfoil (EWM) | No | EWM has been present in this lakes for 10 years. | | No |
| | Pathogens | No | AIS Pathogens not present | | No |
| Work Flow Step (2)<br>The research boat is trailered to Lake Bono. The overland journey takes approximately 2 hours. Once they arrive at the second lake they continue the fish sampling efforts | Fish/Other Vert. | No | No AIS fish are in Lake Ono. | | No |
| | Invertebrate *Cercopagis pengoi* | Yes | Adults & eggs could be on nets and other collecting equipment, the anchor and boat. | Nets, equipment, and the boat can be washed and/or treated to remove or kill the hazard. | Yes |
| | Plant Eurasian Watermilfoil | No | EWM has been in Lake Bono for 8 years. | | No |

## Critical Control Point

- A step at which AIS control can be applied and is essential to prevent or eliminate the hazard or reduce it to an acceptable level.
- One CCP can control more than one hazard
- More than one CCP may be needed to control a hazard.

| 1 Activity<br>Activity, Harvest or Aquaculture Step (from flow diagram) | 2 Hazards<br>Potential AIS hazards introduced or controlled at this step (from potential hazards worksheet) | 3<br>Are AIS hazards significant? (Yes/No) | 4 Justification<br>Justify your decisions for column 3. | 5 Control<br>What control measures can be applied to prevent the significant hazards? | 6 CCP<br>Is this step a critical control point? (Yes/No) |
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| | | | |
|---|---|---|---|
| **Critical Control Point**<br>Each row answered "yes" in column 6 on the Hazard Analysis Form | 1 | The research boat is trailerd to a second lake. The overland journey takes approximately 2 hours. Once they arrive at the second lake they continue the fish sampling efforts at two locations | After the 2 samplir the boat is driven agency's secure, or facility |
| **Significant Hazards**<br>as determined in column 3 of the Hazard Analysis Form | 2 | *Cercopagis pengoi* is present in Lake Ono. It could be transported from there to uninfested lakes. | Nets and collecting have Eurasian water attached which coul into an un-infested |
| **Limits for each control measure** | 3 | No live adults or resting eggs left on boats or equipment. Boats and equipment are washed with high pressure hoses, nets are tagged and only used in infested waters | No viable Eurasian left on boats or eq boats and equipment only used on EWM in or dried for 10 day |
| **Monitoring**<br>Describe what is being monitored | 4 | Presence of adult C. p. or eggs. Ensure that the boat and all equipment is power washed and nets tagged for use in infested waters only are not brought to Lake Bono. | Presence of EWM. Mo boat and all equipm sufficiently power erly tagged, or dri |
| Explain how the monitoring will take place | 5 | Visual inspection for adults. Visually inspect tag on nets. Visually inspect boats for any debris that could indicate power washing was not effective. | Visual inspection f ments. Visually ins equipment for appro |
| Frequency of monitoring | 6 | Each time boat and equipment are used in Lake Ono. | Each time equipment EWM infested lake. |
| Person or position responsible for monitoring | 7 | Staff | Staff |
| **Corrective Actions**<br>Actions taken when limits of control mesaures are not met | 8 | Cease operation and secure clean AIS-free nets, boats, or equipment before proceeding | Cease operation and AIS-free nets, boat ment before proceed |
| **Verification**<br>Method of Verification | 9 | Records review. | Records review. |
| **Records**<br>List what is recorded at each critical control point | 10 | Record washing, drying, or treatment procedures used on boats and gear. Record that nets were inspected for a tag prior to trawling. | Record washing, dry ment procedures use gear. Record that inspected for prope to employee leaving facility at the end |


- 2001: developed for commercial aquaculture and baitfish sectors
- Adopted by USFWS who developed a version AIS-HACCP training for their use
- 2009: AIS HACCP became an international standard ASTM E2590 (Annex A1)
- According to USFWS website there have been over 181 AIS HACCP plans developed across 30 states

# More Industry Involvement?

- Building partnerships to combat AIS and increase safe seafood supply
- Increase and improve surveillance, compliance and reporting
- Help to make laws effective and fair
- Reduce complexity and redundancy
- Protect US commerce and create more jobs

# Adding Verification to AIS HACCP?

State of Michigan Comprehensive Aquatic Invasive Species State Management Plan 2015-2016 (GLRI)

"Towards AIS Free Certification in Aquaculture and Baitfish Industries"
Michigan State University (Weeks), Michigan Sea Grant (Kinnunen), University of Minnesota (Phelps)

1) **Review Task Force Group**
2) **AIS Management in GL Aquaculture and Baitfish Report**
3) **Feasibility Study**
4) **Risk Assessment**
5) **Case Study**
6) **Stakeholder Input**

# Feasibility Study - Model Programs

- AIS HACCP
- Arkansas Certified Bait
- Michigan Agriculture Environmental Assurance Program (MAEAP)

# Feasibility Study - Recommendations

- Use nomenclature of “verification” (as opposed to certification) to avoid confusion with international 3rd party certification programs
- Adding verification to AIS HACCP and incorporating elements of Arkansas Certified Bait program
- Proceed with a case study to test the application/costs/etc.
- Consultation across states and institutions regarding policy and regulations

# Cost estimates per facility for AIS HACCP verification

| | Low | Median | High |
|---|---|---|---|
| Training instruction | 280 | 495 | 710 |
| Training materials | 10 | 20 | 30 |
| Plan development support | 240 | 660 | 1,080 |
| Site inspection | 480 | 580 | 680 |
| Verification process | 1,350 | 1,575 | 1,800 |
| Estimated total cost per facility | $2,360 | $3,330 | $4,300 |
| | | | |
| Estimated re-verification cost per facility | $450 | $525 | $600 |

# Case Study - Model Program

- AIS HACCP with verification
- One or more producers in MI and/or MN
- Requirements:
  - Verification body (VB)
  - Training
  - AIS HACCP plan development and implementation
  - Maintain records
  - Review
  - Recommendations by VB

# Verification Body

- Representation:
  - 1 state natural resources or environmental quality department
  - 1 state agriculture department
  - 1 university or Sea Grant Extension

- Objectives for case study
  - Assess the administrative needs for the proposed AIS HACCP verification program
  - Conduct a pilot standards conformity assessment of a case study verification

# Training

- Online
  - Example: MN Online Aquatic Invasive Species Training

- Hands on
  - Biosecurity for aquaculture facilities
  - AIS HACCP
  - AIS regulations (binder)
  - AIS identification (region specific)
  - Verification requirements
  - AIS HACCP plan review and record keeping

# Training – Regulations (MI)

- Fish Disease Control FO 245.16
  - List of allowable species for importation, stocking, or baitfish
  - Seasonal and site specific fish health testing requirements
- NREPA (Act 451 of 1994) Subpart IV minnows
  - List of minnows and bait species/activities
- NREPA Part 413 Transgenic, non-native organisms
  - Prohibited species list
  - Restricted species list
- NREPA Subpart V Licenses and permits
- Michigan Aquaculture Development Act (199 0f 1996)
  - List of species and activities

# Training – AIS Identification

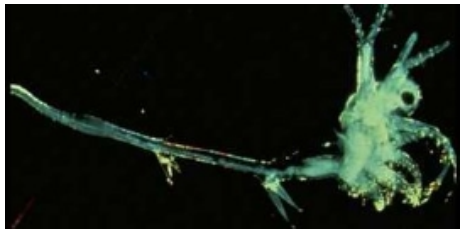
- Interactive
  - Slides and samples
  - Topical issues and concerns

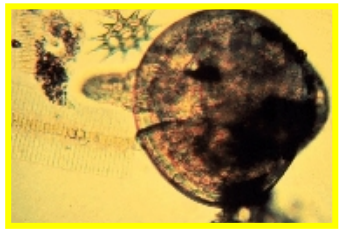
Regulations?

possession

Incidental/ prohibited/restricted


Seasonal / life cycle characteristics





# Training – Verification

- Overview
- Incentives
  - For management agencies
  - For industry
- Specifics of AIS HACCP verification (proposed)
  - Voluntary
  - AIS HACCP plan and record keeping
  - Verification body roles
  - Training
  - Re-verification and nonconformance
  - Legislation and costs

# RECORD KEEPING FORM

Wild Harvest

**Lot ID #:**_____ **Location:**_____

| CCP | Procedure Flow Step | Pass/ Fail | Issue (if Fail) | Corrective Action | Initial & Date |
|---|---|---|---|---|---|
| 1. | Observe targeted baitfish for external signs of disease and presence of AIS | | | | |
| 2. | Observe targeted baitfish in seine/trap for disease and presence of AIS | | | | |
| 3. | Disinfect gear if baitfish appear diseased | | | | |
| 4. | If baitfish appear normal – take fish to truck in buckets containing well water | | | | |
| 5. | Transfer fish to quarantine for short term storage (if necessary) | | | | |
| 6. | Transfer fish to ponds for long term storage (disease test if necessary) | | | | |
| 7. | Transfer of baitfish from pond to holding facility | | | | |
| 8. | Truck fish from holding facility to retail outlets in well water | | | | |

**Reviewed by:**_____ **Date:**_____

# RECORD KEEPING FORM

*Wholesaler*

**Wholesaler**

**Lot ID #:**_____ **Location:**_____

| CCP | Procedure Flow Step | Pass/ Fail | Issue (if Fail) | Corrective Action | Initial & Date |
|---|---|---|---|---|---|
| 1. | Receiving | | | | |
| 2. | Hold in quarantine (holding facility) | | | | |
| 3. | Transfer fish from holding facility to truck & transport to retail outlets in well water | | | | |

**Reviewed by:**_____ **Date:**_____

# Stakeholder Input

Accomplished through surveys

- Online
  - Randomized sample obtained from the North Central Regional Aquaculture Center primary contact list
  - Targeted sample GLP
  - Targeted sample NCR aquaculture associations

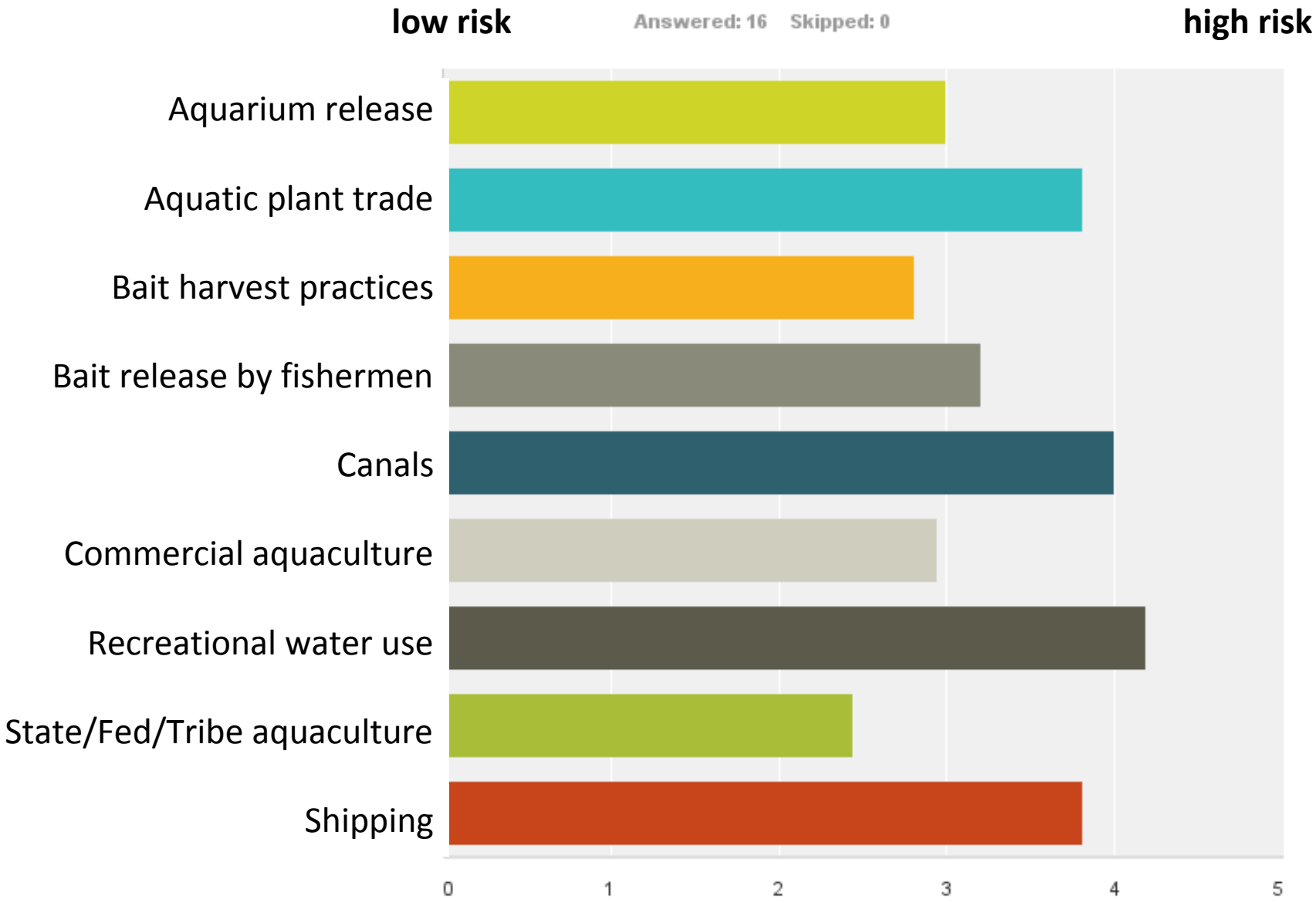
- Post workshop (industry)
- Other?

# Survey Preliminary Results

SurveyMonkey

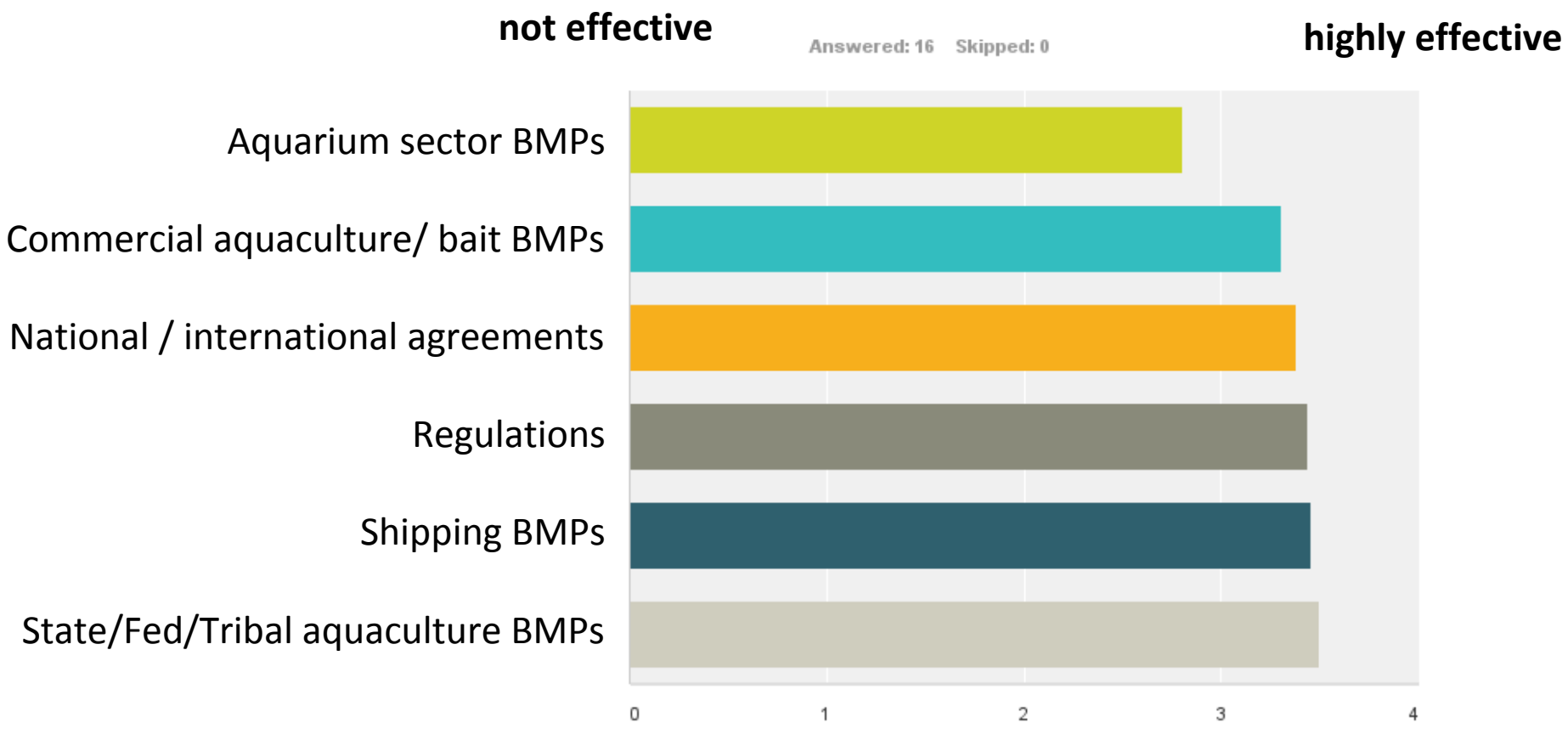
GLP

# For Spreading AIS

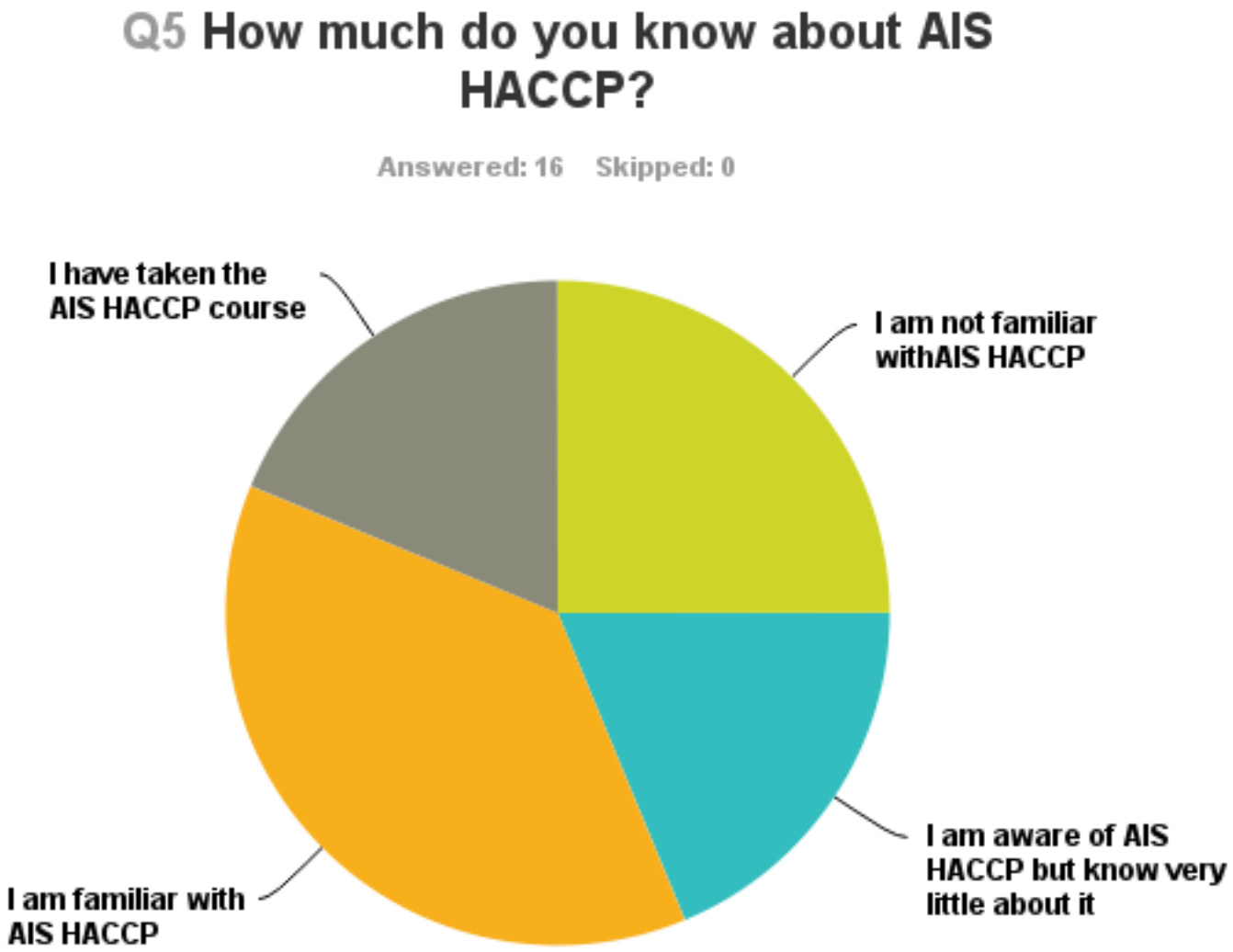


GLP

## For Reducing Risk of AIS Introduction



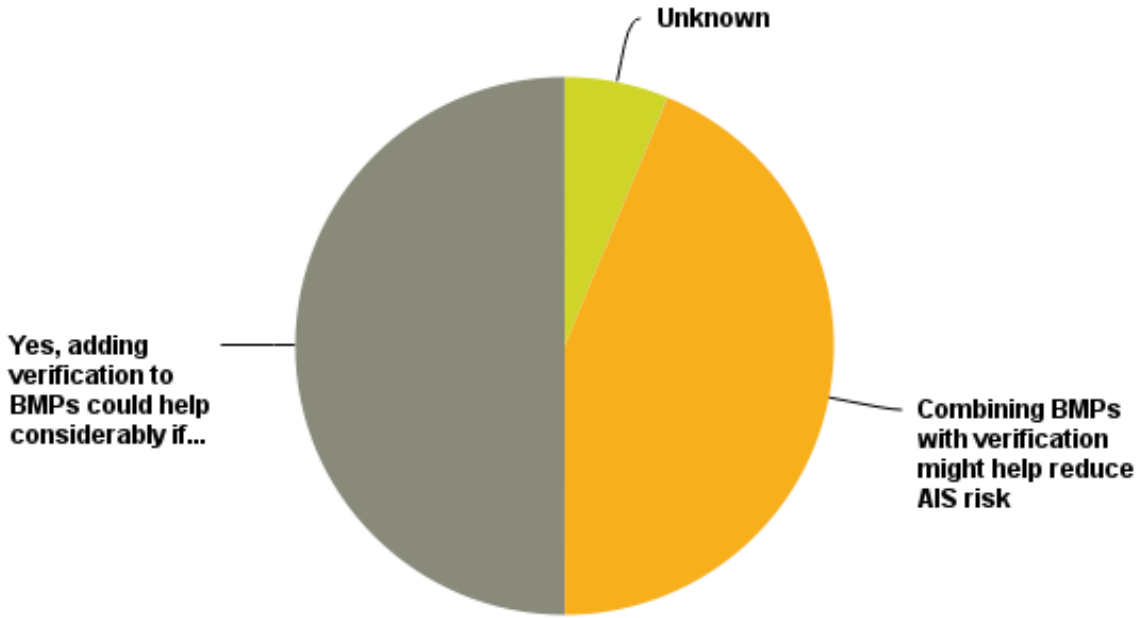
# GLP


Q5 How much do you know about AIS HACCP?
Answered: 16 Skipped: 0
I have taken the AIS HACCP course
I am not familiar withAIS HACCP
I am familiar with AIS HACCP
I am aware of AIS HACCP but know very little about it

# GLP

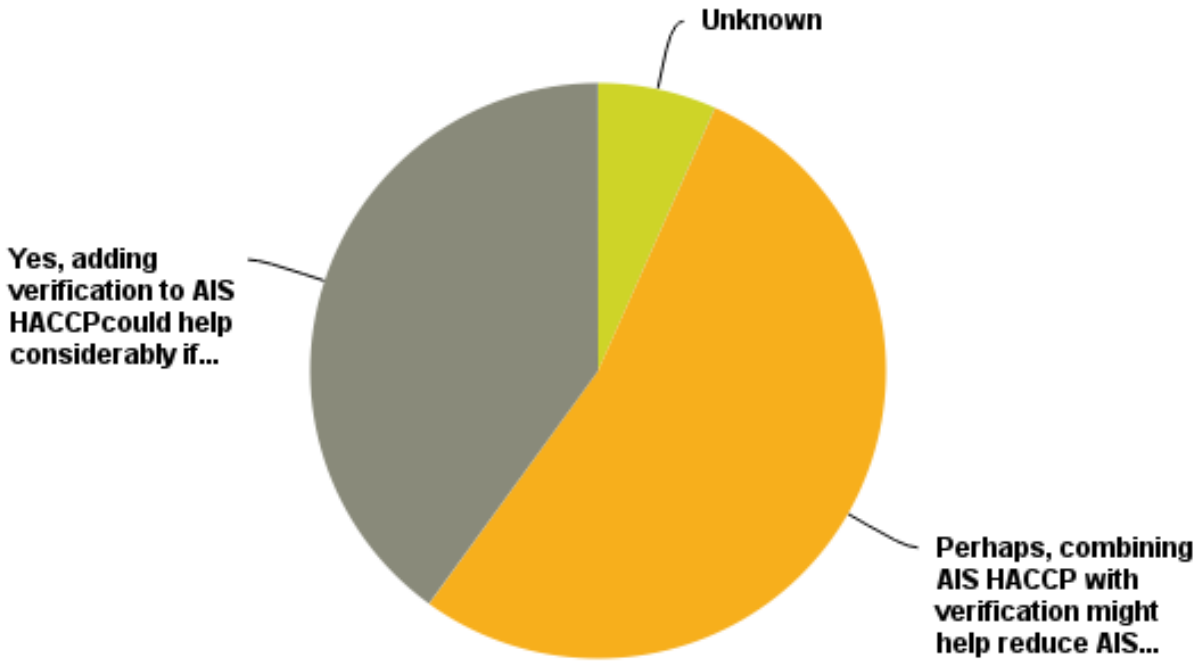
## Q4 Could incorporating a voluntary 3rd party verification program into BMPshelp to reduce the risk of AIS introduction?

Answered: 16 Skipped: 0



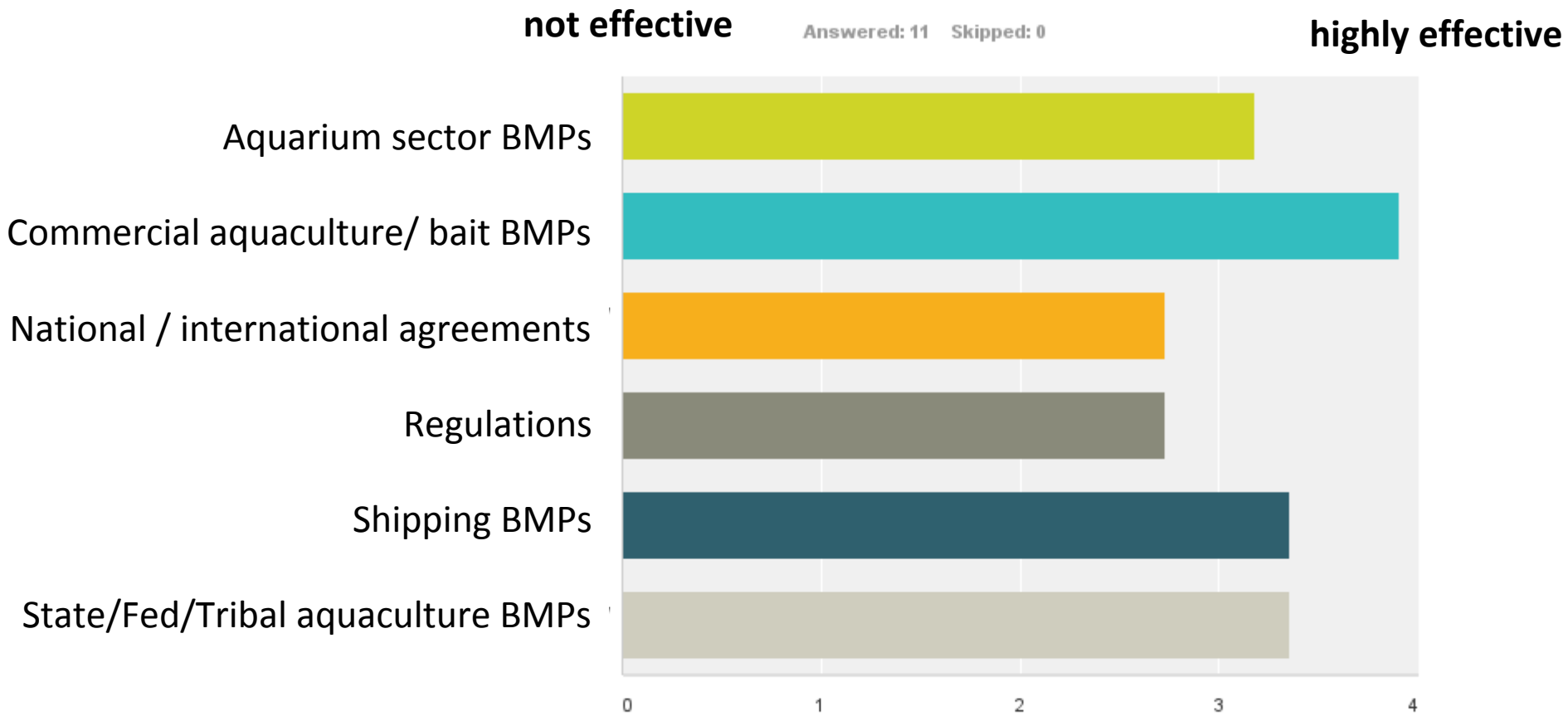

## Q6 Could incorporating voluntary 3rd party verification into AIS HACCP help reduce risk of movement or introduction of AIS?

Answered: 15 Skipped: 1



# NCR Industry (targeted)

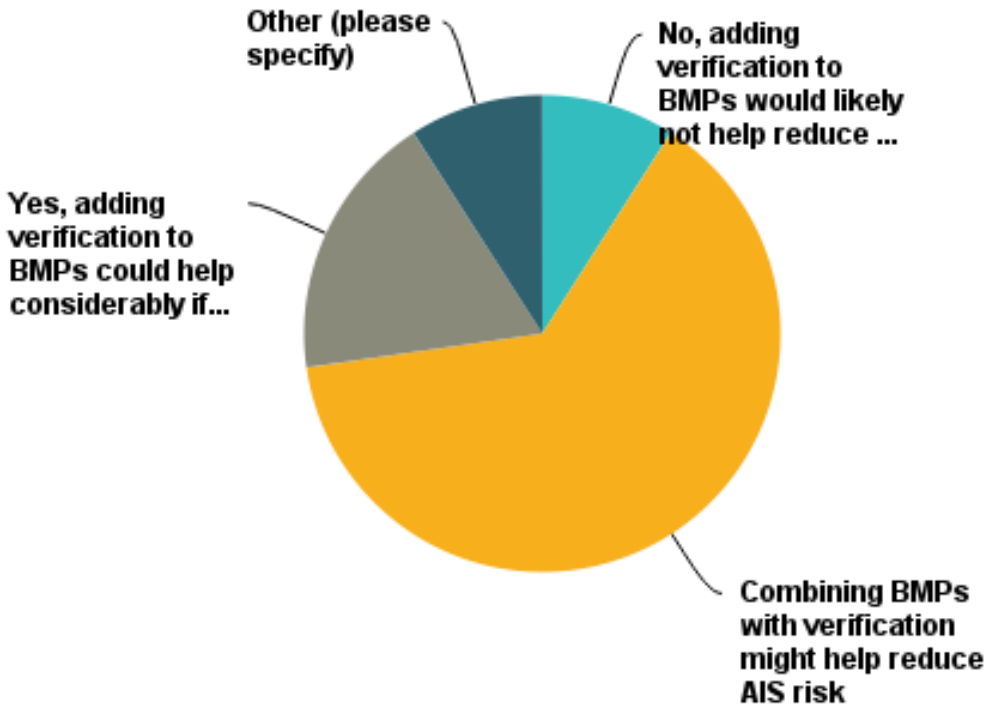
## For Reducing Risk of AIS Introduction



# NCR Industry (targeted)

## Q4 Could incorporating a voluntary 3rd party verification program into BMPshelp to reduce the risk of AIS introduction?

Answered: 11 Skipped: 0

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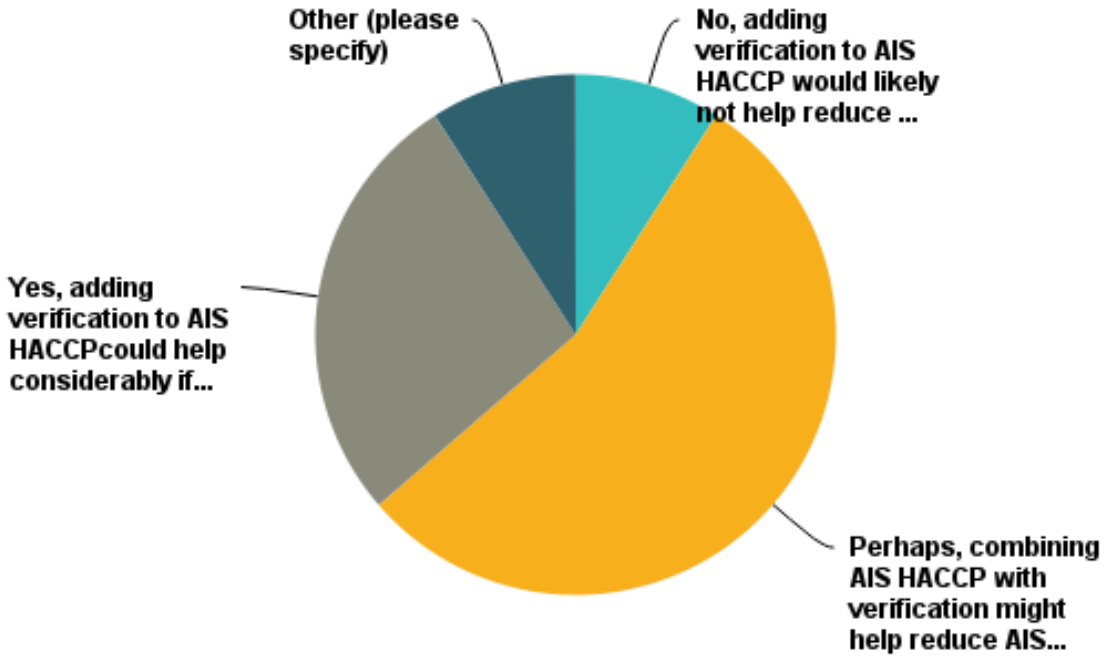

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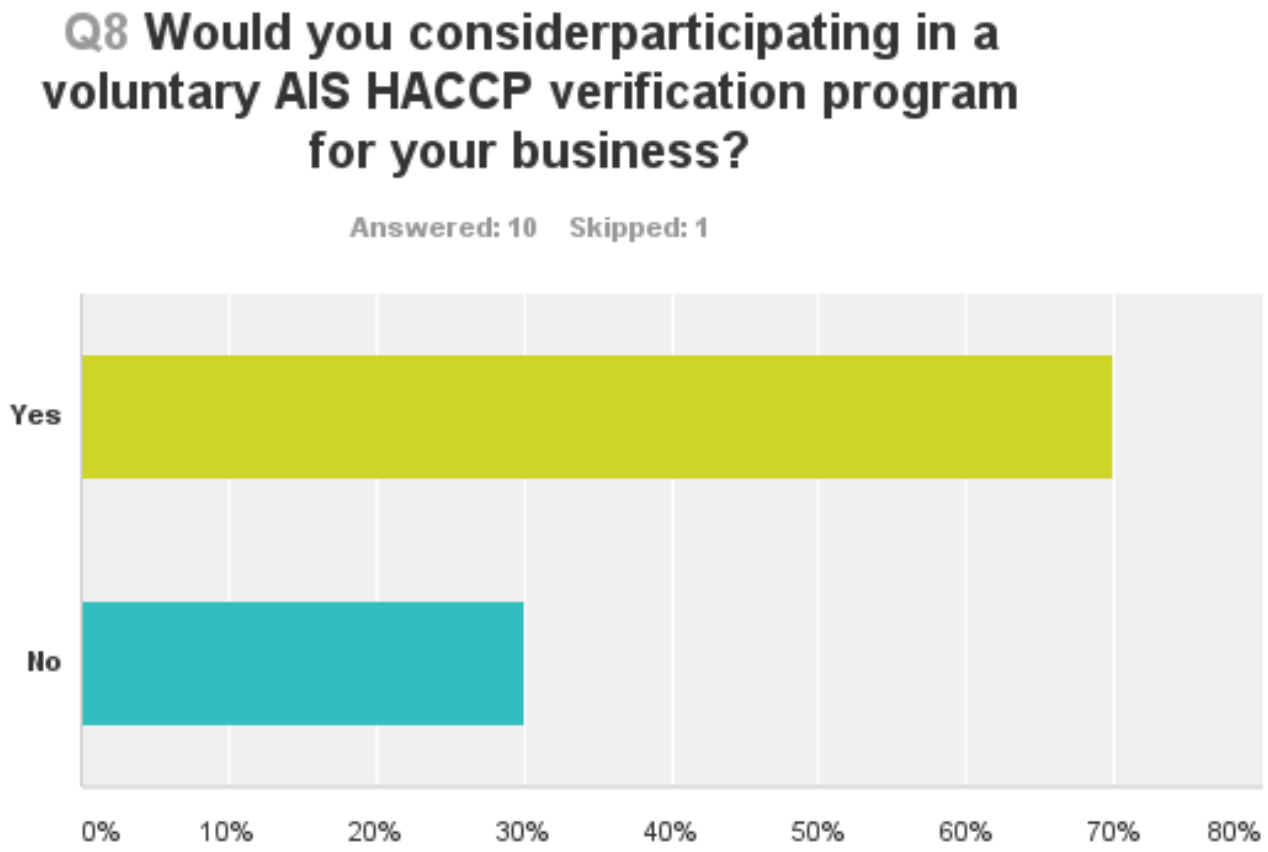



Willing to pay for initial verification

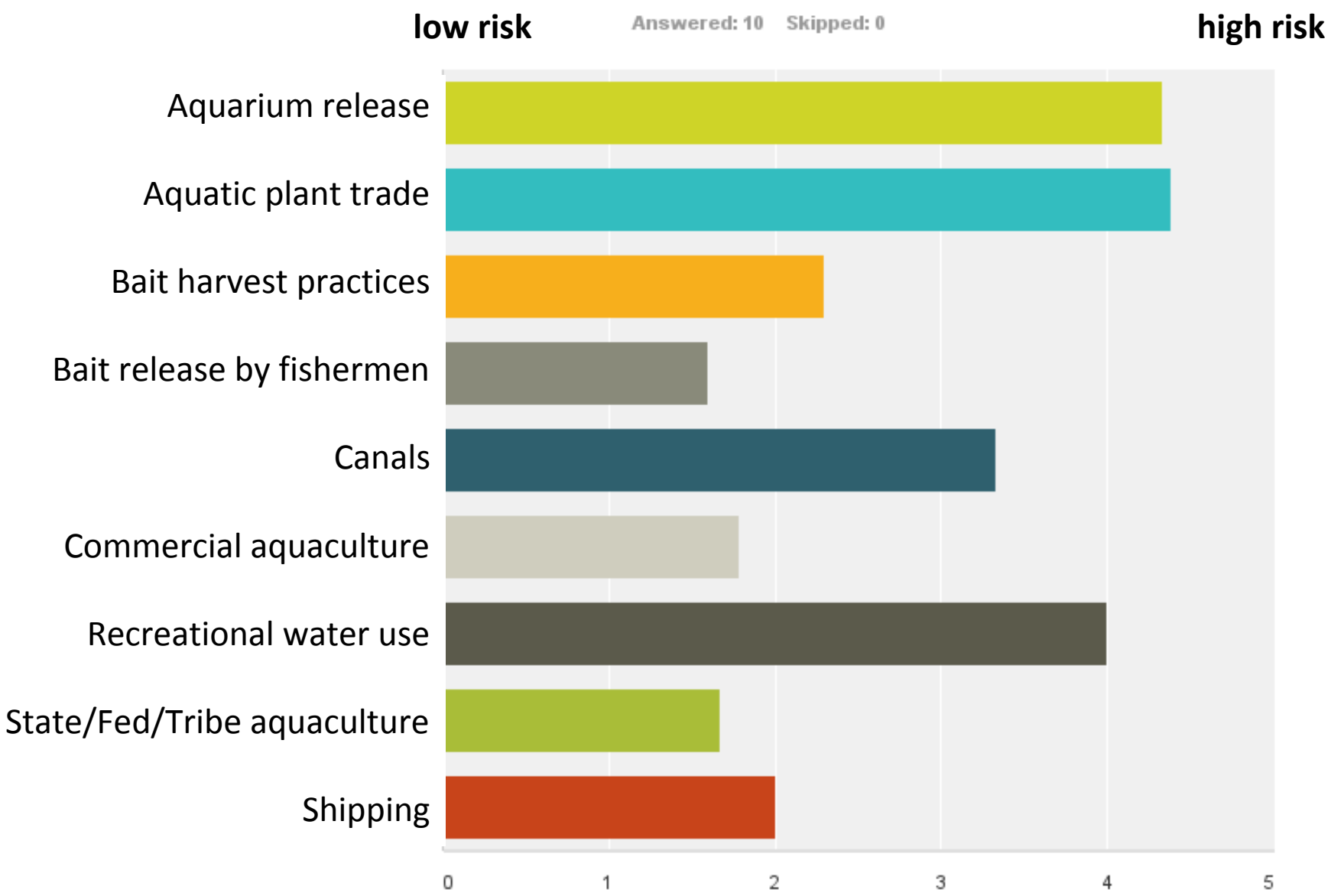
| | |
|---|---|
| < $1,000 | 86% |
| $2,000-3,000 | 14% |

Willing to pay for re-verification

| | |
|---|---|
| < $100/yr | 86% |
| $200-300/yr | 14% |

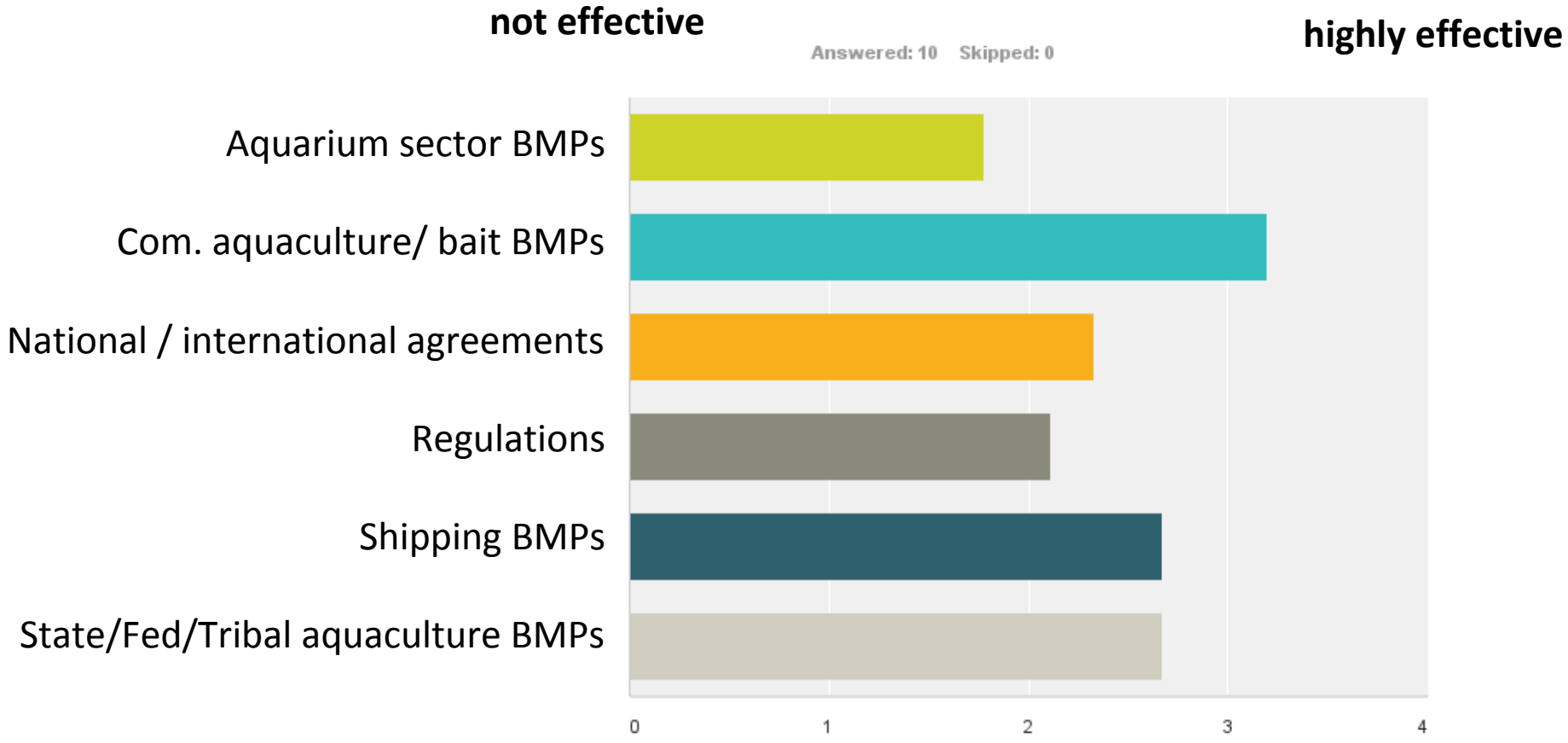
# Baitfish Targeted (post workshop)

## For Spreading AIS



# Baitfish Harvesters
(post workshop)

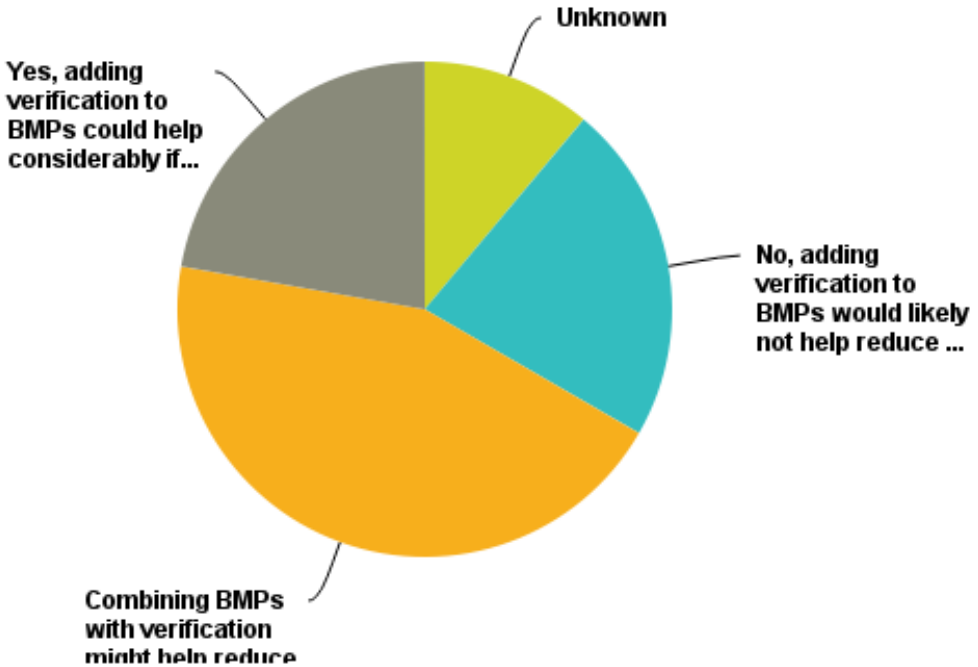
## For Reducing Risk of AIS Introduction



# Baitfish Harvesters
(post workshop)

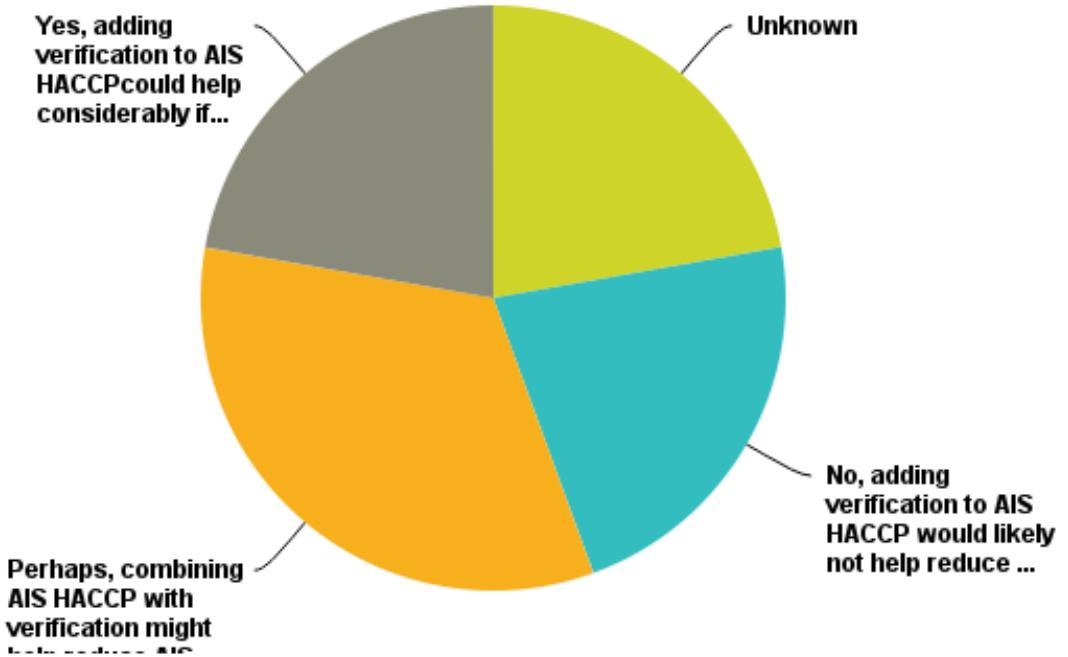
**Q4 Could incorporating a voluntary 3rd party verification program into BMPshelp to reduce the risk of AIS introduction?**

Answered: 9 Skipped: 1




**Q6 Could incorporating voluntary 3rd party verification into AIS HACCP help reduce risk of movement or introduction of AIS?**

Answered: 9 Skipped: 1



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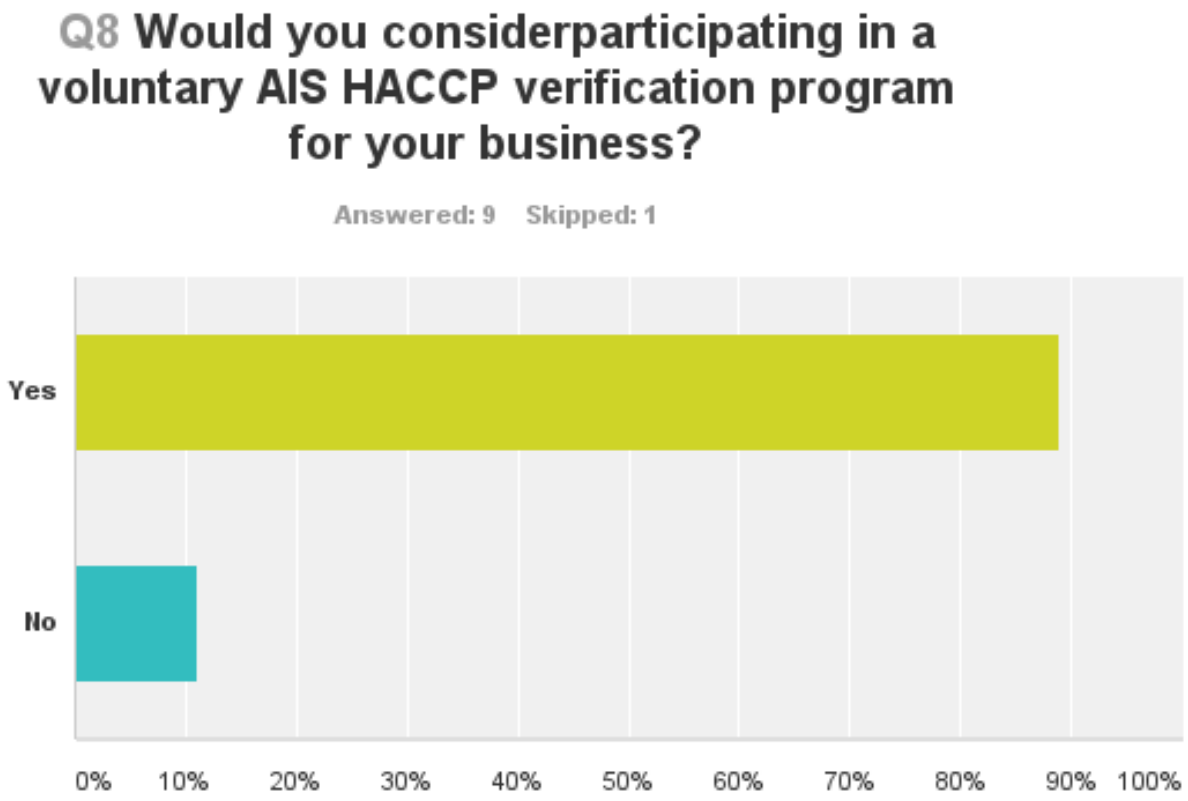


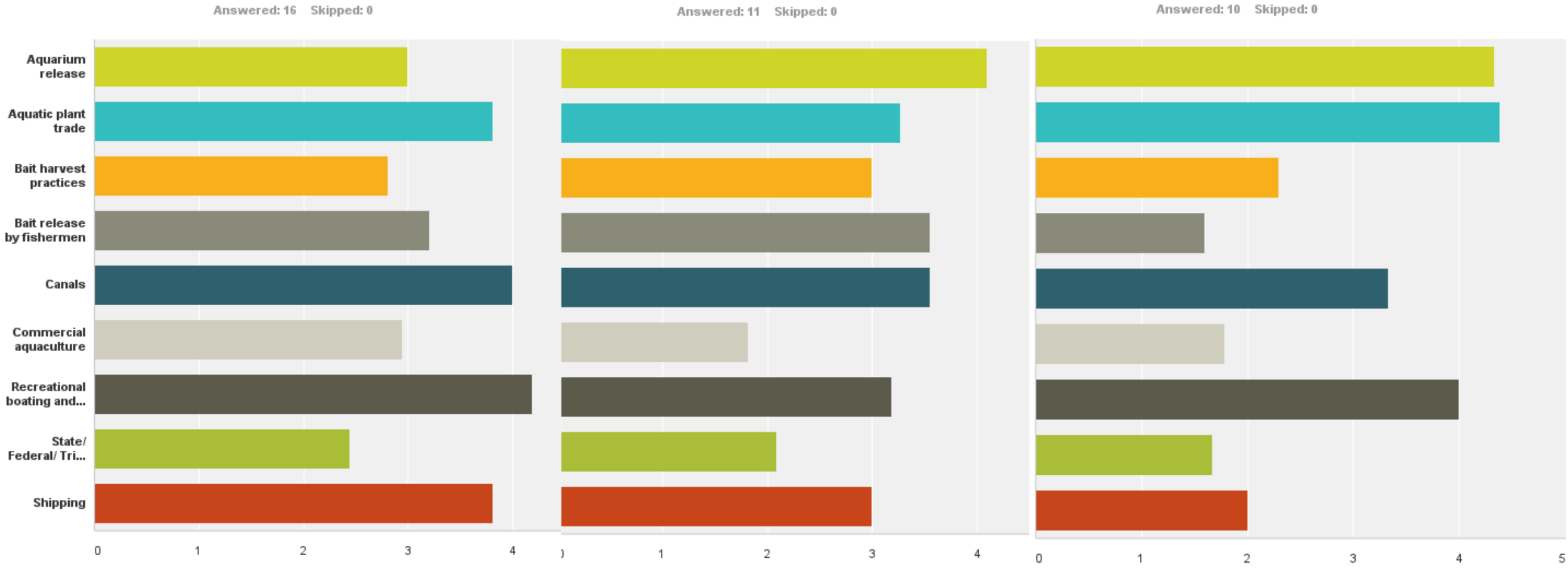

Willing to pay for initial verification

| | |
|---|---|
| < $1,000 | 100% |

Willing to pay for re-verification

| | |
|---|---|
| < $100/yr | 50% |
| $100-200/yr | 50% |

# Q2 On a scale of 1-5 what level of risk would you place on each of the following for spreading AIS (1 = low risk, 5 = high risk)?




GLP NCR Industry Baitfish