

Appendix 1 Responses to survey questions administered to TPWD fisheries staff.

All statements were answered on an agree-disagree scale. All answers have been converted to percentages.

1. Data that are available from agency standardized sampling programs, when used in conjunction with special projects and research studies, produce a sound, scientific basis for making management recommendations.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	0	0	10	90
Coastal	Non-Admin	3	3	3	34	57
Inland	Administration	0	0	7	40	53
Inland	Non-Admin	5	10	3	64	18

2. Methods of data acquisition and analysis are well-founded by existing scientific publications and consistent with procedures accepted by other fisheries professionals and agencies who manage fishery resources.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	0	0	10	90
Coastal	Non-Admin	3	3	7	47	40
Inland	Administration	0	7	0	53	40
Inland	Non-Admin	0	13	0	64	23

3. Employees are provided adequate orientation and training for conducting standardized assessment procedures.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	0	10	30	60
Coastal	Non-Admin	0	7	7	60	26
Inland	Administration	0	13	0	60	27
Inland	Non-Admin	0	5	8	64	21

4. Fishery assessments are based on an appropriate balance of information about fish populations, habitat, and human dimensions.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	0	0	60	40
Coastal	Non-Admin	0	20	13	47	20
Inland	Administration	0	7	20	47	26
Inland	Non-Admin	5	20	3	56	13

5. Flexibility exists for biological field personnel to conduct an appropriate balance of standardized sampling and special studies for meeting specific management needs.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	0	30	60	10
Coastal	Non-Admin	13	37	13	17	20
Inland	Administration	0	0	6	47	47
Inland	Non-Admin	5	15	5	36	36

6. Sampling schemes (site selection, timing, gears) used in standardized assessments are appropriate for the species and habitats in question.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	0	10	50	40
Coastal	Non-Admin	0	7	7	53	33
Inland	Administration	0	7	20	60	13
Inland	Non-Admin	10	26	3	44	15

7. Data are gathered consistent with spatial scales needed for decision-making.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	0	10	50	40
Coastal	Non-Admin	0	7	3	50	37
Inland	Administration	0	7	13	67	13
Inland	Non-Admin	0	8	5	74	8

8. Data are gathered consistent with time lines needed for decision-making.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	0	0	40	60
Coastal	Non-Admin	0	3	3	63	27
Inland	Administration	0	13	0	67	20
Inland	Non-Admin	3	20	8	56	13

9. Attention given to the quality of routine assessment data is appropriate.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	0	10	30	60
Coastal	Non-Admin	3	3	14	53	27
Inland	Administration	0	7	7	66	20
Inland	Non-Admin	5	18	0	56	18

10. Procedures for standardized sampling are promptly revised as problems and needs are recognized.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	0	0	10	90
Coastal	Non-Admin	3	24	13	47	13
Inland	Administration	0	0	27	60	13
Inland	Non-Admin	5	26	13	36	18

11. Topics addressed in research and special studies are appropriately prioritized.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	10	30	60	0
Coastal	Non-Admin	7	20	23	40	10
Inland	Administration	0	0	13	80	7
Inland	Non-Admin	5	10	28	46	8

12. Data from routine assessments and special studies are accessible by all appropriate personnel.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	10	0	70	20
Coastal	Non-Admin	7	30	10	33	20
Inland	Administration	0	13	7	53	27
Inland	Non-Admin	0	13	10	49	26

13. All data acquisition and analysis activities are tied directly to management decision-making.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	20	0	60	20
Coastal	Non-Admin	3	24	13	33	27
Inland	Administration	0	27	7	53	13
Inland	Non-Admin	5	28	3	51	13

14. Roles and responsibilities of staff positions associated with information gathering, analysis, and management decision-making are clear and consistent.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	0	10	50	40
Coastal	Non-Admin	7	33	3	37	20
Inland	Administration	0	13	0	60	27
Inland	Non-Admin	5	13	5	59	18

15. Limits and strengths of data are well-documented in reports and technical publications for decision-makers to judge the extent to which science supports management decisions.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	10	10	50	30
Coastal	Non-Admin	7	7	23	56	7
Inland	Administration	0	27	13	47	13
Inland	Non-Admin	10	26	20	33	8

16. Precision of sampling and estimation procedures is adequate for intended management decisions.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	0	10	30	60
Coastal	Non-Admin	0	7	7	66	20
Inland	Administration	0	33	13	54	0
Inland	Non-Admin	8	26	15	43	5

17. GIS approaches are being used to their potential in data acquisition, analysis, and management decisions.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	30	10	40	20
Coastal	Non-Admin	7	40	23	27	3
Inland	Administration	0	46	20	27	7
Inland	Non-Admin	13	49	10	23	3

18. Data acquisition and analysis activities are adequate for managing non-game aquatic resources.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	30	0	50	20
Coastal	Non-Admin	7	37	23	30	3
Inland	Administration	13	47	20	20	0
Inland	Non-Admin	21	38	28	7	3

19. Statistical capabilities and expertise of staff are appropriate to challenges of study design, data analysis, and report preparation.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	0	10	50	40
Coastal	Non-Admin	0	26	7	47	20
Inland	Administration	0	6	0	47	47
Inland	Non-Admin	0	13	10	49	25

20. Data acquisition and management decisions of TPWD are coordinated with programs of other relevant State and Federal programs involved with managing Texas' natural resources.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	0	10	50	40
Coastal	Non-Admin	0	7	23	60	10
Inland	Administration	0	13	13	60	14
Inland	Non-Admin	7	18	38	31	3

21. Human dimensions data are fully integrated into the management decision process.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	0	20	60	20
Coastal	Non-Admin	0	17	33	33	17
Inland	Administration	0	13	13	67	7
Inland	Non-Admin	3	23	20	44	7

22. The incorporation of capabilities of the former Resource Protection Division into the Fisheries Divisions will enhance science-based management.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	20	0	50	30
Coastal	Non-Admin	0	10	43	30	17
Inland	Administration	7	13	7	60	13
Inland	Non-Admin	0	8	28	41	18

23. Communication within the Division is adequate regarding scientific activities and progress.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	30	20	50	0
Coastal	Non-Admin	13	47	7	26	7
Inland	Administration	0	13	7	80	0
Inland	Non-Admin	13	18	18	44	7

24. Opportunities for continuing education and in-service training are adequate for staff to stay current on new management approaches and technologies.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	0	0	80	20
Coastal	Non-Admin	13	44	13	23	7
Inland	Administration	7	0	7	53	33
Inland	Non-Admin	5	15	5	59	13

25. Access to scientific information via library, internet, professional journal subscriptions, and meeting attendance is adequate to support science-based activities.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	10	0	70	10
Coastal	Non-Admin	13	44	0	33	10
Inland	Administration	13	7	7	46	27
Inland	Non-Admin	5	20	8	46	18

26. Employees are encouraged to advance their scientific expertise through continuing education, attendance of professional meetings, and other means.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	20	0	60	20
Coastal	Non-Admin	10	33	10	37	10
Inland	Administration	0	13	0	20	67
Inland	Non-Admin	3	18	7	46	23

27. For recreational species, the agency places the appropriate amount of effort on each species.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	0	0	70	30
Coastal	Non-Admin	3	7	7	60	23
Inland	Administration	0	13	20	60	7
Inland	Non-Admin	13	36	2	36	10

28. An appropriate balance of options for stocking, habitat management, and harvest regulations is applied in fisheries management.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	10	40	30	20
Coastal	Non-Admin	7	40	17	33	3
Inland	Administration	0	20	13	60	7
Inland	Non-Admin	13	15	3	59	7

29. Budgets are adequate to fund activities essential to making management decisions.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	20	0	70	10
Coastal	Non-Admin	7	46	10	30	7
Inland	Administration	7	46	0	40	7
Inland	Non-Admin	0	31	15	46	8

30. The balance of agency programs for recreational/commercial species, non-game species (including threatened/endangered), and habitat resources is consistent with the mission of TPWD.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	0	0	50	40
Coastal	Non-Admin	7	20	7	53	13
Inland	Administration	0	27	13	53	7
Inland	Non-Admin	0	18	26	41	15

31. Resource management decisions are made with appropriate consideration of scientific information.

Division	Staff	Strongly disagree(%)	Disagree (%)	No opinion (%)	Agree (%)	Strongly agree (%)
Coastal	Administration	0	0	0	40	60
Coastal	Non-Admin	0	23	10	54	10
Inland	Administration	0	0	7	66	27
Inland	Non-Admin	2	13	8	56	18

Appendix 2 Responses to open-ended questions administered to TPWD fisheries staff.

**COASTAL ADMINISTRATION-- QUESTION 1.
RESPONSES: 8**

What is the greatest strength/impediment in the agency's ability to apply scientific information to resource management?

- **Strength** – a long-term, consistent database to work with.
- The fishery independent and fishery dependent sampling programs are the greatest strength in the agency's ability to apply scientific information to resource management. Without these programs, the quality and quantity of data would not be available. The programs are well designed, statistically sound, tested, and retested. They are court room tested. Their longevity, approaching 30 years, is a test they also have passed. Data is worth a 1000+ words. When the TPWD commission and executive office say we are science based, they do mostly rely on and trust the data from our management programs.
- Scientific data generated from the coastal fisheries resource management sampling program is incorporated directly into management decisions. Management decisions are largely based on the data generated.
- Strength – long-term standardize data collection process and the resulting data base.
- Strengths: High levels of professionalism and training in all levels of staff; Scientific basis for resource and harvest sampling programs that has produced ability to view long-term trends; Confidence of TPWD Commission and upper level management in the validity of data-based conclusions.
- **Impediment** – The “turn-around time” of data from collection to master file (available for analysis) is too long (can be 6 months or longer). This limits the ability to react to potential problems quickly.
- The greatest impediment is the delay between the time data collection has occurred and the time the data are available for use by decision-makers. Currently we are working with an 8 month time delay, and we have recently had up to a 12 month delay
- The impediments are minor compared to the strength of the overall programs. An impediment is the standardization and repetitiveness of the sampling program itself. Due to the nature of time consumption required by program staff in the collection of data, they do not have adequate time to review, study, analyze and really get to work with their data as they should.
- Another impediment is that frequently upper level decisions by division directors, executive office, or commissions over ride data with personal agendas, politics, or other pressures. Although these are often a good reality check, fear of controversy by commissioners negates or dilutes power of data based decisions.
- Short response time lines, lack of data for non-game species/issues.

- No agency escapes political scrutiny/pressure/direction. This is normally appropriate, however, it creates momentum that is difficult to redirect when needed. Thirty years ago, there was a problem with speckled trout and redbird. That problem no longer exists, but it would be difficult to know this from the way that budgets and resource allocations occur. There are other species that deserve greater attention that will not occur until a new mythology is developed.
- Impediment is the lack of available scientific data to answer questions that sometimes fall outside the scope of the resource sampling scientific design.
- Impediment – erosion of staffing and funding over time, we need more of both to improve our resource management.
- Impediments: High level of political interest and influence in all aspects of resource management; Inability to complete all recommendations, especially for large habitat projects due to inadequate funding.

COASTAL ADMINISTRATION-- QUESTION 2.

RESPONSES: 8

What is the greatest strength/weakness in standardized assessment procedures?

- **Strength:** Ability to collect lots of data.
- Greatest strength is consistency, continuity, and accessibility.
- Longevity is one of the greatest strengths of the standardized sampling program. The fact that during its life, the program has been scientifically reviewed statistically tested, retested, refined, and continually assessed via a QA/QC program and staff input.
- Strength is the long-term nature of the sampling program to evaluate population trends;
- Strength – the length of time it's been in place, the quality control measures implemented.
- The greatest strength is its flexibility.
- Strength: Ability to evaluate long term trends as well as current status because of consistency in scientific sampling procedures.
- **Weakness:** In some cases, data don't lend themselves to questions that need to be answered.
- Does not allow estimates to be made on localized impacts to resources (i.e. oyster mortality on a specific reef due to a flood event).
- Greatest weakness is the task of converting collected information into digital power
- The weakness in the program is the cap on number of personnel and amount of money for equipment. These affect time use, communication and to a lesser extent the overall ecosystem understanding, but not negative ability to collect data under current design. Maximum use of person and equipment leaves not margin of error or room for breathing and understanding.

- Weakness is the random sample design that limits the application of critical analyses to other types of practical studies (i.e., catch and release). However, separate special studies are often available to perform these types of investigations.
- Weakness – some additional sampling is needed in the near shore Gulf, Human Dimensions, etc. but staff and budget constraints will not allow for this at this time.
- The greatest weakness is inherent in the design—we have a tremendous amount of data on common species, and less data on less common species. Also, as a species declines and we need to know more, we have less data.
- Weakness: Difficulty in redirecting research/assessment focus quickly for short-term issues. Requires clear evaluation of tradeoffs since rarely can both be financially supported for long.

COASTAL ADMINISTRATION-- QUESTION 3.

RESPONSES: 8

What is the most pressing issue anticipated in the next 10 years that will require science-based input from the agency?

- Reduced fresh-water inflows into bays and estuaries.
- Freshwater inflow into coastal ecosystems is the number one issue, and this will require significant amounts of science-based input.
- Water and its management in Texas.
- Insuring there is enough freshwater inflow to maintain estuarine health. The increasing pressure of sport anglers on fish populations.
- Protection of health of aquatic ecosystems in water management decisions.
- There are four pressing issues in the next 10 years:
 1. Continued pressure on resources (such as fisheries harvest).
 2. Continued habitat alteration and/or loss.
 3. Continued changes in (loss of) freshwater to the estuaries.
 4. Continued need for public education.
 - 1a. We have a fairly good handle on #1. We can adapt as data indicate. Growth in human populations on the coast may create pressures we are unprepared for. For instance, this may lead to catch and release fisheries in some recreational species, and certainly a curtailment of many extensive commercial fisheries.
 - 2a. We have a poor handle on #2. Although agency is involved in its own habitat protection/enhancement projects and is involved in habitat permit review process, I am unaware of global studies assessing cumulative impacts of all little projects within an ecosystem. This is critical if we want to do something proactive.
 - 3a. We are involved in this arena, unfortunately with little regulatory teeth, but with great expertise and interest. We must maintain our presence, enhance our understanding, and commit our resources for more and better data.

4a. We are involved but not unified or consistent from within our own division or within the larger scope of the agency. Within the division, I don't believe we have a strategic outreach/education plan nor within such a plan a mechanism to measure success or at least account for our efforts.

- I believe there are several that within the next 10 years will require science-based information.
 1. How to allocate fresh water throughout a watershed so that various flora and fauna in brackish or saline water or coastal wetlands are given adequate consideration.
 2. Fisheries around the world are being overfished and we won't be spared the multiple compounding problems associate with this enormous problem.
 3. What are the most effective and cost-efficient ways to restore or protect aquatic habitat that can be instituted rapidly? What will the political climate allow us to do or assist us to do today (or soon) that will still have an impact in 10 years?
- Population assessments for a number of Gulf fisheries that are in trouble. Vessel monitoring systems, trip ticket systems, and use of marine protected areas are some of the management tools that need to be implements for better management of the fisheries.

**COASTAL ADMINISTRATION-- QUESTION 4.
RESPONSES: 8**

To what extent is the agency positioned, in terms of staff expertise, organizational structure, and facilities, to provide adequate scientific input to the most pressing resource issues anticipated over the upcoming 10 years?

- The Division is well positioned in all of the above to address future resource issues over the next 10 years, provided legislative budget constraints are not imposed.
- Relatively few staff (10) dedicated specifically to water issues but this number is growing. Other staff is supportive and willing to help, when requested.
- We are there, but we have to wait to be called into the conversation.
- Within the confines of current politics and economics, I think our agency is doing its best to be prepared to face resources issues in the next ten years. I believe the agency documents, Land and Water Conservation Plan and the Natural Agenda, give us guidance. I believe the development of a division operating plan, will aid in uniting the braches within Coastal Fisheries Division. Time will tell whether the combining of Coastal Fisheries and Resource Protection Divisions will strengthen our ability to manage ecosystems on a more global basis with a broader understanding of all components. Currently we have a division director who seems to want to be proactive and successful in this area.

- Personnel issues are my greatest concern. Classification structure and salaries seem to always produce ceilings and hardships in retaining well qualified employees and in recruiting well qualified employees, especially those areas of newly evolved technologies or applications. Stagnant state salaries are eroding employee's buying power annually, and is compounded with the absence of within agency mechanisms for advancement (pay steps or long range career tracks) or reward for achievement (merit or achievement bonuses). Also, the obviously different special treatment of game wardens (higher pay, higher retirement, special privileges, and over abundance of recognition by upper management within the agency) is very demoralizing to college educated staff.
- An aging work force is one of my concerns. The baby boomers, who make up a large percentage of our work force, are rapidly nearing retirement. The turnover rate at many Coastal Fisheries Division field stations has been low, thus potentially creating an experience drain when the elders retire within the next few years. Coastal Fisheries Division has not embraced or outwardly endorsed the rehire of retirees as has Inland Fisheries Division. The executive office should be concerned that Inland Fisheries Division has all of their experienced regional directors on a "rehire the retiree" basis. Rehire of all reapplying retirees sends a message of "done deal" to other employees, prevents upward mobility within the ranks, and sets the stage for a mass exodus of rehires at an undeterminable time and with potentially bad consequences. Enough soap box.
- Continuing education of professional as well support and technician staff is inadequate. Constraints include time (full work load), money (who has money and who pays), and upper level leadership not initiating advanced, appropriate and applicable training for staff.
- Equipment and facilities are always an issue, the answer to which is more money. Minimum mileage requirements and caps of the number of trucks is a hurdle we can over come with some extensive planning, but one that would be much simpler without such tight restrictions. Facilities, both Austin and the field, are all at maximum capacity for space. There is no long range plan that I know of for currently needed and future office needs, especially in the field.
- Overall, the agency seems to be in fairly decent shape to meet future scientific challenges. Strong leadership is in place to lead the way; and, plenty of resources and support are provided to scientific staff so that they can accomplish their objectives. A higher salary for scientific staff would no doubt go a long way to keep the "best" people for longer periods, and possibly attract other high quality applicants.
- We are in adequate shape for maintaining the current protocols, but we need more staff and resources to take on addition scientific data collection efforts that will be necessary for sound management in the future. Our existing staff is strong. Some of our facilities are not adequate to fulfill our mission, particularly at Port O'Connor and Perry R. Bass, and to a lesser extent at CCA/CPL MDC.
- TPWD has recruited highly qualified staff and continues to train and support them. Staff expertise is a strong point.
- All government bureaucracies are just that – bureaucracies; and as such are slow to redirect. The organizational structure at TPWD is changing toward more

- integration, but still has internally competing units that weaken its overall effectiveness. There should be more capability to create “strike teams” that quickly form, then evaluate an issue, investigate potential solutions, and recommend options with a fast track to consideration and potential implementation. Those ad-hoc groups will counter the inherent clumsiness of bureaucratic stuff. TPWD should not focus on creating multiple high-end highly scientific research facilities because of the lack of money for those kind of facilities. Alternate approaches that don’t require extremely high investments in real property (e.g. long-term research agreements with many of the superior universities/colleges in Texas to support specific research issues for our needs) may be the most cost effective measure to support the level of scientific input that we should provide. Our mandates and missions are not necessarily covered by others, so we should not expect to receive the answers we need unless we financially support the research. My approach is to avoid investment in multiple facilities in favor of using other institutions’ facilities for our work.
- We are in good shape, although we could use more data analysts.

**COASTAL NON-ADMINISTRATIVE—QUESTION 1
RESPONSES: 30**

What is the greatest strength/impediment in the agency’s ability to apply scientific information to resource management?

- **Strength:** Lot of data waiting to be analyzed.
- Greatest strength is the Coastal fisheries Data Base created from the long term standardized sampling programs, and good data analyses personnel.
- One of the greatest strengths in the agency’s ability to apply scientific information to resource management are the long term monitoring programs which allows the agency to make sound fisheries management decisions.
- The consistency and quality of the sampling program.
- It’s greatest strength is the data that has been accumulated while an impediment may be the lack financial resources to continue it’s mission.
- There is a tremendous wealth of talent and experience within the agency.
- Our greatest strength is in our unsurpassed long term coastal fisheries data set.
- Greatest strength is long-term fishery-dependent and –independent monitoring programs...need to continue these at any cost!
- Consistent procedures and collection of data.
- Our greatest strength is our routine monitoring program and the staff that implements it.
- The greatest strength is the database, which consists of data collected continuously from most bays dating back to the 1970’s.
- The greatest strength is the ability to incorporate long term data into management decisions.

- Our greatest strength is having a consistent time series (+ 20 years) of standardized data. This allows us to monitor trends over time and estimate the statistical error around this estimate.
- Strengths: Long-term and consistent data collection. Computerization of collected data.
- The greatest strength is the massive amount of fisheries data available for a considerable period of time (~30 years).
- Using solid science.
- Strength – Several people have detailed knowledge of the strengths or quirks in the data files. The 25 + years of consistent data collection techniques allows the division to objectively review changes in populations with changes in the environment.
- Strength-overwhelming magnitude and range of the database information on resources is extracted from.
- Strength – The Department’s leadership that addresses resource management issues with initiative and instills the importance of “good science” to staff by listening to their ideas and suggestions related to developing and applying scientific information.
- Strength: Quality of data from excellent monitoring programs.
- Strength: Standardized coast-wide statistically valid sampling protocol.
- Strength is Coastal Fisheries (CF) long term monitoring programs that allow us to recommend sound management measure.
- The 30 year monitoring program is the foundation and greatest asset for all of our management decisions.
- Strength: Communication, professionalism, and collaboration among division’s decision makers.
- The greatest strength are the people. Field employees that have been around for years and the influx of “new blood”. The ability to pass on a wealth of knowledge and pride in a good well done to the new comers.
- The greatest strength is TPWD’s ability to hire such great biologists, I’m impressed with the dedication of our biologists’ expertise in their particular system(s).
- **Impediment:** Lot of data not being analyzed due to lack of man-power or funds - errors sometimes appear in the database due to keypunch errors.
- Impediment: Complexities associated with assessing vast and complicated databases.
- Impediments: Data analysis and reporting efforts are small relative to data collection and computerization efforts.
- Our greatest impediment is not being able to offer more in depth analysis. Trend analysis can only indicate whether a population is in decline or not. We need to provide better scientific input to fisheries management. This would include developing fisheries population models, analyzing gear interactions, predicting sustainable effort levels, analyzing the positive of area closure to both people and fish populations. One further point is that most of our energy is spent on

- collecting data; precious little time is spent on analyzing it with a view of providing this input.
- One of the agency's impediments would be the lack of real time technology in some divisions that allows the agency to be proactive in some management decisions and recommendations.
 - Impediment is the lack of real time technical and data collection to allow CF to be more proactive in making some management recommendations.
 - Our biggest impediment is the lag time between data collection and reporting.
 - Impediments that affect the agency's ability to apply scientific information to resource management include: political interest that may direct decisions away from scientific basis, lack of funding for expansion or upgrade of equipment and tools used in data collection and analysis, and lack of communication between divisions within the agency.
 - The impediment is hard to define, science is used in a lot of our resource management, but at the same time, it is not. For one example populations fluctuate due to not only fishing pressure, but also abiotic influences such as weather, salinity, etc., so one regulation one year may, be sufficient, but the same regulation to the next year could actually impact the population negatively. The hardest thing to do is to find a conservative balance while appeasing to the public (which is difficult in itself).
 - Time.
 - The greatest impediment is the fact that we are influenced by political considerations and management decisions sometimes seem based more upon a desire to satisfy the constituency rather than scientific data; for example our red drum stocking program is extremely popular with the public but we can't quantify its effectiveness.
 - Greatest impediment is internal politics, personal egos of upper level management, and top down management and decision making. External politics are also a considerable impediment.
 - Politics – Millions of dollars spent on marine game fish stocking without good scientific information demonstrating effectiveness and actual game fish population increases. The extreme public popularity of the program appears to negate the possibility of objective research to assess the question.
 - Impediment-“political” or “special interest” pressure to modify management recommendations for the benefit of specific user groups.
 - Impediment: Pressure from political sources.
 - Impediments: Bureaucracy burdened by allegiance to special interest groups. Lack of dedicated time for open discussion of issues. Lack of discussion of issues between senior decision makers and field biologists.
 - Budget constraints and politics are major impediments.
 - An impediment is also employees that have been around for years, are resistant to change and have an attitude of complacency. Another impediment is Austin staff (non field) people who do not listen to the suggestion of the staff in the field. They ask for opinions, but it sometimes feels like they are only going through the motions.
 - Personal agendas.

- Funding – money spent on non-essential but popular programs, along with reduced legislative support → non-competitive salaries/no pay raises in several years → dissatisfaction/frustration among employees, overuse of limited, but critical personnel, and the inability to retain/attract new, high quality staff.
- Lack of communication within & among divisions – information on program activities and needs does not travel down the hierarchy to people in the field (ie. biologists) who can assist in, and have the capabilities to help in development of practical sampling strategies and clear goals & objectives. Information on program activities & research does not travel between divisions, resulting in duplication of effort and missed opportunities to use the extensive capabilities available through multi-division coordination.
- The pressure to publish research in internal agency documents creates an environment in which publication in external peer-reviewed formats is secondary; external peer review increases the credibility and repeatability of research
- Weakness – TPWD does not invest enough in human capital. Not enough staff really knows the database or the history.
- Impediment - Lack of funding to adequately and competitively compensate fishery scientists. This problem results in difficulty attracting and hiring scientist that enhance our ability to apply scientific information to resource management. In addition, this funding problem also hinders moral, reduces initiative and prevents adequate staffing to effectively address some resource management issues that the Department is faced with.
- The greatest impediment could be the lack of an updated library with adequate journal subscriptions in field stations.

COASTAL NON-ADMINISTRATIVE--QUESTION 2 RESPONSES: 30

What is the greatest strength/weakness in standardized assessment procedures?

- **Strength.** Long term data base and good data analysts.
- Strength – very consistent data, very high level of “trust” in data.
- Obtaining quality data.
- Strengths: Reliable and defensible. Comparability of collected data among years.
- Strength: Ability to compare data between years and areas.
- The greatest strength is again the massive amount of fisheries data readily available for analysis, which has been obtained through a reasonably uniform sampling over the years.
- Strength-consistency of data collection over time.
- Strength – Continuity and comparability of the data over long periods of time and changes in personnel.
- Strength: Ability to withstand court proceedings; comparable coastwide data from year to year.

- Strength: 30 years of trend information from standardized fishery-independent and fishery-dependent monitoring programs.
- A great strength is 30 years of standardized sampling, you can compare apples to apples.
- The greatest strengths are the programs that allow us to chronicle events that affect fisheries over time and provide the information needed to make recommendations.
- The consistency and quality of the sampling program. Because this makes the program stronger, changing what has been done to better assess what is needed, is very difficult.
- The greatest strength is the data that has been gathered over time and a possible weakness would be “standardization” or the inability to adapt to a change needs.....
- A strength is that from our data collection, we can assess the impacts from hydrological and meteorological events as well as regulation implementation on the environment and its fisheries.
- Its consistency over 30 years is difficult to argue against.
- Our standardized assessments are good.
- General enough to catch most species, not specific enough for less common species.
- Length and consistency of the database are extremely powerful, but underutilized.
- A well thought out standardized set of operating and survey procedures insures standardization of data collection.
- Strength – CF has a long term management program in place that allows us not only to chronicle events in the fishery but also provides information that allows us to make recommendations for management measures that will ensure the continued health and sustainability of our fisheries.
- Coastwide consistency in sampling methodology; Coastal Fisheries has stressed quality control and consistency from the beginning.
- The greatest strength of our standardized assessment procedure is that through consistent data collection techniques, it has allowed us to assemble an enormous database which spans almost thirty years. We have been able to answer most questions that have come up over the years with this data. However, it’s not perfect. For example, when questions regarding the harvest of live gastropods were raised recently, we had very little data to look at. We had to conduct a special study to begin to answer some of the questions surrounding this issue. Overall, I think we do an excellent job with the resources that we have, and I believe our standardized assessment procedures are excellent. We could expand our monitoring efforts to provide a more complete picture of coastal ecosystems, but it would require more resources than we currently have.
- The greatest strength lies in the ability to utilize the same procedures coast-wide, with our quality control ensuring data are collected and analyzed year-to-year in a comparable manner.

- The greatest strength of the standardized assessment procedure is having a stratified random design for selecting sampling stations. This avoids bias in determining catch estimates.
- I believe the procedures in itself are great IF ALL ARE DONE CORRECTLY.
- Not sure
- **Weakness** – Difficulty of addressing questions that deal with species or issues that the procedure is not designed to assess. For example, natural resource management issues dealing with species rarely encountered in a given standardized sampling program.
- Weaknesses: Standardized assessment procedures directed at the entire resource may not provide adequate data for all species. (However, appropriately directed special studies should fill data gaps when needed.)
- Although focus on game fish is important, the ecosystem that supports the game fish (early life history of game fish, non-game fish, invertebrates, zooplankton, and phytoplankton) has been relatively unexamined. To successfully manage the game fish in the long term, we must understand more of the complete ecosystem. Game fish are not independent of the ecosystem as a whole.
- Do not account for differences in variety of habitats (benthic versus pelagic, random sampling design versus need for sampling specific areas or reefs equally over time)
- The greatest weakness is that such strict adherence to a specific set of protocols prevents us from recognizing and changing protocols to better and more efficiently assess the status of the resource. We also concentrate our efforts and resources on analysis of only recreationally or commercially important species rather than utilizing additional “indicator” species to better determine the overall ecosystem status.
- Status quo. Do it this way because that’s the way we always done it. Resistance to change.
- Our biggest shortcoming is the apparent unwillingness to re-evaluate some of the standardized sampling schemes to either increase or decrease sample size to allow for special studies sampling.
- The greatest weakness might be a lack of communication with other agencies or universities to update these procedures.
- The greatest weakness is not having a study of gear selectivity to coincide with the assessment. Understanding gear selectivity and efficiency is a vital component of analyzing fish populations in an independent monitoring study such as the one employed at TPWD.
- Specific Weakness: Oyster dredge CPUE is underestimated – the number of dredges taken to obtain shell is not recorded.
- Weakness – bad procedures, like using a very small net to sample the Gulf, have been institutionalized.
- Weakness: Commercial landing estimates are based on a self-reporting system which is based on trust and assumptions and lacks quality assurance.

- Weaknesses would include not enough staff and funds to completely assess commercial fishing, for-hire fisheries and special studies. Also at issue would be the lack of a mentoring system that passes on institutional knowledge of many of the monitoring programs.
- Weakness-resource intensive nature of standardized assessments precludes conducting many special projects and leaves insufficient resources for broad – ranging data analysis.
- Weakness: Infrequently we see trends that would be better elucidated by some targeted sampling, either areas or time periods.
- Weakness – Little time or funding for special projects or studies and lack of staff and funding to increase or include sampling of commercial and for hire fisheries in The weakness is forcing the exactness, importance and pride taken in sampling procedures on employees that really don't care.
- The weakness is forcing the exactness, importance and pride taken in sampling procedures on employees that really don't care.
- One weakness is that we can't sample all areas that are necessary to assess some situations because we are restricted by spatial and temporal limits (i.e. problems in the estuaries don't necessarily start in the estuaries). We need more special studies to go along with our standardized procedures to enhance our ability to manage the resources.
- Very few weaknesses in our biological assessment programs.

**COASTAL NON-ADMINISTRATIVE--QUESTION 3
RESPONSES: 30**

What is the most pressing issue anticipated in the next 10 years that will require science-based input from the agency?

- Effects of reduced freshwater inflows into Texas water bodies (effects on salinity gradient and fish distribution).
- The most pressing issue for the next 10 years is securing sufficient in stream and inflow fresh water to maintain the health and productivity of streams, rivers, and bays.
- Freshwater inflow to the estuaries.
- Reduction in freshwater inflows to estuaries.
- Fresh water inflow.
- Determining the effects of decreased freshwater inflows into Texas estuarine systems on fishery resources and developing management strategies to deal with those effects.
- The most pressing issue in the next 10 years would be demands on water and demands on coastal habitat and fisheries resources. These issues would include freshwater inflows and population growth. Population growth leads to increasing demands on water for both consumption and industrial use. It also leads to increasing pressure on the ecosystems, particularly the fishery resources.
- Freshwater needs for resource.

- Freshwater inflows.
- The every decreasing freshwater inflow to the estuaries.
- Water, Water, Water. The lack of water it's affect on ecosystems and wildlife.
- Evaluating the impacts of freshwater inflows, or lack thereof, on the estuarine systems of Texas.
- Habitat loss. Freshwater inflows. Gulf limited entry.
- Freshwater inflow, multispecies/ecosystem management.
- Continued habitat loss due to land development and inflow loss due to environmental flow constraints.
- Allocation of freshwater among user groups and downstream resources, and the impact of water on estuarine and marine species.
- More emphasis on freshwater inflow into our bays and its importance on recreational fishing, regulations should and I believe will have more of a fluctuation throughout the year. More drastic changes will be made in our regulations and appeasing to the public will be difficult.
- Water allocation issues along with Limited Entry into many commercial fisheries (oyster, Gulf Shrimp, etc)
- I think the increasing demand that Texas' growing population is placing on freshwater reserves in this state is without question, the biggest problem natural resource managers will face in the next decade, and beyond. We will depend not only on sound science, but the ability to communicate what we know, and what we will learn with the public, and policy makers. We will need to educate them on the role that freshwater plays in maintaining healthy ecosystems, and convince them of the importance of maintaining healthy ecosystems across the state.
- How loss of habitat (population growth + loss of inflows) will equate to lower and lower levels of allowable harvest or allowable access
- The most pressing issue will be dealing with the increased human impact upon our coastal bays whether it's due to simply the increasing human population/habitation in coastal areas or the effect of reduced freshwater inflow to the bays. Wildlife will always be secondary to people and industry in these conflicts and we must work to educate the public on the needs of wildlife and work to establish a realistic goal for inflows. We must also recognize that current management/ research procedures may need to be modified or changed to more accurately monitor how these changes are affecting or will affect the resource.
- How to protect and sustain fish populations from the negative effects of habitat loss, over-fishing and water pollution.
- Loss of freshwater inflows to bay and estuaries and related loss of historical hydrological regimens, loss and degradation of coastal wetlands (nursery areas), and loss of historical ingress/egress opportunities due to water control structures.
- Increasing demand for a limited resource.
- The most pressing issue over the next 10 years is the continued exploitation of natural resources (water, fisheries, wetlands, seagrasses, etc.) in the face of a growing population.
- Ecological changes on the coast of Texas resulting from global changes in the environment (warming, reduced influx of fresh water, etc.)

- Increased human population exerting more pressure on finite bay systems and resource populations, as well as decreased freshwater available for estuaries (because of increased demands by humans).
- Population growth will result in increase demand on water resource making it more difficult to secure adequate freshwater inflow into bays and estuaries ensuring their continued health and productivity. Challenge will be strike a balance between human and wildlife and fisheries needs.
- Population growth will result in increasing demands on fisheries resources from increasing numbers of recreational anglers and increased efficiency of commercial fishermen. CF will need to be more proactive in our management of fisheries and not wait until a crisis develops.
- Population growth may result in increased loss and/or degradation of critical habitat. Challenge will be to find a balance between growth and habitat protection and restoration.
- Coastal population growth and its demands and impacts on the various resources.

**COASTAL NON-ADMINISTRATIVE--QUESTION 4
RESPONSES: 29**

To what extent is the agency positioned, in terms of staff expertise, organizational structure, and facilities, to provide adequate scientific input to the most pressing resource issues anticipated over the upcoming 10 years?

- In good shape for expertise and facilities, poor in organizational structure and internal communications processes.
- We have the staff, organizational structure and facilities located in each ecosystem that will allow us to monitor and meet resource issues in the future.
- I feel they are better staff than other states, yet we need to better assess what our needs are and acquire the individuals or train those we have to meet what is coming.
- I think the agency is positioned to tackle the pressing resource issues for the upcoming 10 years. I believe that the agency provides opportunities for continuing education, that many of our existing staff continues to develop expertise in their fields and that we should strive to improve upon the quality of newly hired staff. The organization structure is sound and workable while our facilities are adequate. I think we are ready for what comes.
- Expertise may be there, if time is not a factor, staff size still may be lacking.
- The capabilities are there. Organization and clear goals are questionable.
- The staff expertise and organizational structure are there, the facilities could be improved but are also pretty good.
- The agency is positioned well, but not well enough to provide adequate scientific input to all aspects of this issue.
 - 1) Current staff has a high level of expertise, but this high level must be maintained and even improved by adequate funding and the creating of competitive salaries and attractive incentives.

2) The jury is still out on the effectiveness of the current organizational structure. Coastal Fisheries has been a division that responded well to natural resource issues showing initiative and staff involvement to address them with scientifically based decision making. This is how such as small Division acquired a positive reputation in the Department and with the Legislature. The current organizational structure may not promote this same performance level, but this remains to be seen.

3) Facilities are generally adequate and in some areas active planning for maintenance and expansion to accommodate staff's needs is underway. Continued planning and increased funding will be required to maintain Coastal Fisheries in adequate facilities in the future.

- More staff needs to be in our "Science Group". While we have many biologists with a very wide array of knowledge, very few are actively involved in research.
- The agency has the resources (people and knowledge) to accept management challenges for the next decade. Legislature needs to continue funding routine monitoring and special studies; the agency needs to continue to be proactive in working with user groups to anticipate problems, and young staff need to be ready to fill management gaps as older managers retire.
- We are just now pulling resources to find out our limitations in data collection and expertise, hiring new and innovative people is only one step, reeducation of our existing staff is another avenue, but more important is the issue of increased sampling efforts in the appropriate and critical areas identified that might be lacking or not telling us information we need now to make management or allocation issues in the future.
- I think we are currently positioned well in terms of talented, experienced staff, and good leadership, and the recent addition of the Water Quality and Habitat teams from the old Resource Division puts the Coastal Fisheries Division in a much better position to deal with our greatest upcoming challenges (population growth, and lack of freshwater inflows). However, the challenge of dealing with these issues in the future will likely require more resources in terms of facilities, equipment and manpower to adequately address them. In addition, recent cuts in benefits, as well as a lack of regular cost-of-living pay increases may make it difficult in the future to recruit talented people to the agency. Generally speaking, I think we do well with what we have, but we could always do more with more resources.
- The agency is positioned fairly well in regards to dealing with increased human impact on resources or at least the capabilities are there. However bureaucracies tend to be rather slow to change or modify procedures to better deal with new or different factors impacting the resource. And it is the willingness to change or modify protocols that concerns me. Integrating RP *fully* into the resource divisions will be a key in our ability to adequately deal with these resource issues and this is not occurring as smoothly as I had anticipated. We must also realize that our obligations and responsibilities to the resource involves more than tracking trends of commercially or recreationally important species and be more willing to become involved in special studies designed to answer specific problems or questions.

- Currently, staff expertise and facilities provide adequate scientific input to address the pressing issues; however, as staff retire or move to other positions, I believe there are not enough qualified or experienced personnel to replace vacant positions. The lack of competitive salaries and incentives decrease the agency's ability to recruit and maintain qualified staff.
- I believe the department has the staff expertise, but not the organizational structure to facilitate scientific research. At the field stations most of our energies are spent on data collection, a lot of which could be more efficient, especially as it relates to entering, submitting and editing data. By reorganizing and updating these procedures we could free up extra time to allow qualified staff to conduct research on pressing issues. However, even with extra time it will be difficult to accomplish better research capabilities without having an organizational structure that allows, encourages and supports interested staff to move in this direction.
- Infusion of Resource Protection Division's coastal programs into Coastal Fisheries Division should provide organizational structure and needed expertise in addressing coastal habitat concerns.
- Combining Resource Protection and Coastal Fisheries was probably a first step in preparing for the next 10 years. However, merging the appropriate staff together to accomplish the difficult tasks will be challenging. Gathering input from all staff as to the "how" has already taken too long, some have not even been approached and it's been 10 months. Meetings regarding our routine programs that solicit staff input have not taken place in Coastal Fisheries for many years. Some special studies have and are occurring in certain areas without a long range plan being discussed by field staff and senior managers. I believe it will happen but it is taking too long.
- TPWD is well staffed and equipped currently; however, I believe that many employees will retire within 5-10 years and it would be critical to hire people with higher degrees and/or sufficient expertise.
- If federal funding is maintained for standardized assessment procedures, appropriate data will be available; however, adequate and timely analysis and synthesis of these data may be jeopardized unless more effort is directed towards this task.
- Engaged in a proactive approach to environmental issues.
- Greater emphasis should be placed on developing ecosystem based management instead of species specific management.
- Good and likely adequate overall, but not great. We could use some more expertise in the field of ecosystem management and monitoring. Need to provide for more field staff and monitor the fishery independent (non-fish related) aspects of our ecosystems, such as water quality, seagrass colonization, human dimensions. Facilities and monitoring efforts will most certainly need to make wise use of technological advancements and continually upgraded.
- The culture and politics within CF does not provide for good staff management practices. This shortcoming is amplified by the State's failure to allow CF to use the capital generated by license sales to pay staff and buy the stuff people need to do a good job. Current management and current budgetary handicapping by an ill-advised legislature has created a work environment that will not allow TPWD

to address critical issues in a productive, entrepreneurial way. Employees are not motivated or compensated to produce high quality work. TPWD cannot effectively address the needs of a growing Texas population unless Texas allows TPWD to make attractive offers to excellent workers. Texas must allow TPWD to provide bonuses and performance-based promotions and compensations to retain quality workers once they are here and trained. It is all about the people, not the science. If the outcome is good, the product will be very good.

- I believe the agency is positioned well in terms of expertise to document and respond to diminishing freshwater inflows. Realistically, there is little the agency can do to maintain current, already restricted, inflows without legislative mandates.
- Not positioned very well to address freshwater inflow issues. Too few personal dedicated to the issue and an inadequate “game plan.”
- We have the staff. But we need to place more emphasis on the “big ticket” items like inflows. In the past, less important fisheries issues took precedent over issues like inflows. PRIORITIZE
- CF has the staff, organization and facilities at its field stations to monitor and address resource issues as they arise.
- Old outdated facilities need to be improved. Staff level/expertise in the field is adequate for the current job, but upcoming changes may require additional staff.
- I believe that currently we are sufficient in expertise, structure and our facilities, who’s to say what will happen between now and 10 years from now. All I know that, TPWD would be up to the challenge whatever may be dealt.
- I think we are well staffed to take care of any issues.

INLAND ADMINISTRATION--QUESTION 1 RESPONSES: 14

What is the greatest strength/impediment in the agency’s ability to apply scientific information to resource management?

- **Strength** – Inland Fisheries has consistently used scientific information to make fisheries management decisions.
- The agency has the resources to develop adequate data upon which to firmly base science decisions relative to resource management. However, the agency must be willing to “stay the course” when the science data leads to controversial or unpopular decisions. This blends into the somewhat murky subject of translating science into policy with legislative and public oversight.
- Greatest strength – high level staff, adequate budget.
- The agency’s greatest strength is its staff, which is well trained, highly motivated, and extremely dedicated.
- Strength – Caliber and training of staff makes them science strong.
- Strength – TPWD employs a very talented staff, including specialists who support a larger, more generalized staff.
- Strength: Staff commitment to science base decision making.

- The greatest strength would be the professionalism and expertise of our staff.
- The greatest strength is the strong scientific capability of our staff and the recognition by Department leadership that the applying the results of this work to management decisions will produce desired results.
- Strength-Innovation and desire.
- Strength: Leadership recognizes the importance of and places a very high priority on science-based decision making.
- Strength – In Inland Fisheries it is the relative absence of pressure to make decisions based on political interests and the knowledge level and professionalism of staff.
- **Impediment**-manpower and funding.
- The agency's greatest impediment is funding. More field staff and associated equipment is needed to adequately manage the state's vast fisheries resources.
- Politics and negotiations to quickly resolve issues without adequately considering scientific information.
- Impediment – We are a political agency and some decisions are made for political reasons.
- The greatest impediment is when legislative or well-connected constituents are able to short circuit the scientific decision-making process.
- Impediment – Too much emphasis placed on satisfying special interests.
- Greatest impediment – too big a state, lots of water, not enough staff to cover it all adequately.
- Impediment – Maybe across the agency it would be the massive extent of the resource and the limited monitoring possible with existing staff.
- Limited staff/time for the amount of water that the agency is mandated to manage. Focus is on trends and we are finding it increasingly more difficult to monitor 'important' lakes annually because of the vast number of waterbodies within a district.
- Weakness - In general, staff is spread too thin. Employees must constantly juggle priorities and there is not enough money, staff, or time to do a thorough job.
- Impediment: not enough funding / staff to collect appropriate data.
- Impediment: Shortages of the amount of scientific information (in some cases) on which to base decisions.
- The greatest impediment would be manpower/budget constraints that often do not allow us to collect adequate data for truly statistically sound.

INLAND ADMINISTRATION--QUESTION 2
RESPONSES: 15

What is the greatest strength/weakness in standardized assessment procedures?

- **Strength:** Consistent, long-term data sets that show valuable “trends” on numerous fisheries across the entire state – these have also served us well politically because all significant lakes are sampled on a regular basis.
- The obvious strength is that data collected in the same manner (to the extent possible) are more likely to be directly comparable.
- Greatest strength – the goal of consistent data collection to allow comparison of trends over time.
- Strength – Consistency in data which allows pooling, time series analyses, etc.
- Strength – Ability to accumulate comparable data that will lead to a better understanding of ecosystem relationships.
- Flexibility to address new questions
- Anytime you can develop standard, consistent ways of collecting and analyzing data that demonstrate sound science, you are better off. That being said, the agency must be willing to constantly revise and revisit those procedures to make sure they conform to the most up to date and sound methodologies available. The typical pattern at most agencies is that receptiveness to change occurs with a turnover in staff (e.g., new people, new ideas). A regular pattern of science review, internally and externally, should be a goal.
- Greatest strength – data is consistently collected and analyzed the same over time and across water bodies.
- Standard procedures are based on “best information available” and are continually updated as needed. Procedures are repeatable and therefore suitable for acquiring trend data and are generally adequate for identifying major problems.
- Strength-Randomized sampling.
- Strength – Standardized sampling eliminates sampling bias.

- **Weakness-Adequate funding/manpower.**
- The research upon which the program is based has not been formally published, therefore, it has not received appropriate external evaluation. Sample sizes are small and confidence intervals are large. Cannot afford to increase sample sizes because of staff/time limitations.
- Weakness: minimum amounts of sampling are usually not enough to “statistically validate” our conclusions. This is because our field staffs are spread too thin and cannot always afford the time to sample as intensively as they might like.
- Greatest weakness – biologists tend to perform the minimum statewide requirement and don’t have to “think” about why they are sampling in the first place.
- Weakness – Cookbook procedures provide too easy an opportunity for staff NOT to think.

- Data acquired from standard procedures sometimes lack the precision needed for definitive management decisions. Staff is afforded the opportunity to conduct additional sampling to improve levels of precision, but these efforts are sometimes thwarted by manpower limitations.
- Weakness – Sometimes our sample size for target species is too small to properly determine status.
- Greatest weakness – recognition that some procedures are not yielding adequate data but because of standardization there is a reluctance to change.
- A weakness includes that a fair amount of effort is expended collecting data that are not used. This includes at least some of the electrophoresis data on largemouth bass populations that are consistently demonstrated to be highly introgressed.
- Weakness – The inefficiencies of accumulating data that may not be used in decision-making.
- The greatest weakness in the relatively small sample sizes that are caused by limited manpower/time.

**INLAND ADMINISTRATION--QUESTION 3
RESPONSES: 15**

What is the most pressing issue anticipated in the next 10 years that will require science-based input from the agency?

- Instream flow assessments for water quantity and quality necessary to maintain aquatic resources and their habitats, and implementing such determinations.
- Water conservation.
- The biggest issues relate to human demands on the system, both from the standpoint of increases in recreational activity from a burgeoning population as well as the basic need for water for municipalities. This is clearly an urbanizing state with all of the attendant issues relative to resource conflicts. Direct user conflicts are inevitable, for instance, at popular reservoirs near cities--dock owners may not like vegetation even though the levels may be optimum for sportfish habitat. Human dimensions aspects will have to be considered, and beyond just those narrowly focused on fisheries management. If the Department does not take a proactive stance in recognizing these issues, then we may be left on the sideline as municipalities and water authorities step up to address them.
- Water resource issues will undoubtedly impact both the resource conservation and direct fisheries management responsibilities of the Department. Demands for water will grow and influence both water quality and quantity issues in streams, rivers, bays, and estuaries. Fluctuations in reservoir levels will undoubtedly be a byproduct of water demands, which will test the ability of management biologists to deal with a host of issues relative to water quality and habitat. Many reservoirs may have to be managed with new strategies and the Department will need to be a player in water rights issues to protect both instream and reservoir habitats.
- Water use issues.

- Lack of water – since fisheries will never economically match the importance of other industry, we have to show a value that can't even be equated in dollars.
- Demands on water are increasing and it will be difficult to keep fisheries at current levels without huge buy-in from the public – economic evaluations are one method of demonstrating the importance of the resource, but the tragedy of the commons will be the priorities in which water is used and what is left for the ecosystems. We have to get better at tightening estimates and monitoring trends. Environmental chemistry may become increasingly important as it may help indicate impacts on populations and the environment.
- Water allocation for fisheries recreation and changing customer demographics.
- Water planning
- How will fisheries resources get adequate consideration when it comes to water allocation?
- Water availability.
- Water quality and quantity - habitat
- How to insure there is sufficient water left in river systems to allow aquatic habitats to survive in rivers, impoundments, and for freshwater flow into bays and estuaries.
- Although water allocation looms as the most pressing long-term, statewide issue for the agency, I feel toxic golden alga presents the most pressing issue for fishery resources now and in the immediate future.
- Habitat and environmental changes, loss, and degradation associated with a growing human population, which are manifested in ways we do not completely understand including, perhaps, increasing distribution and persistence of toxic algae blooms such as *Prymnesium parvum*.
- Habitat degradation and invasive species.

**INLAND ADMINISTRATION--QUESTION 4
RESPONSES: 15**

To what extent is the agency positioned, in terms of staff expertise, organizational structure, and facilities, to provide adequate scientific input to the most pressing resource issues anticipated over the upcoming 10 years?

- I believe we are well positioned to address issues based on the expertise of our current staff.
- Very well positioned.
- I feel we are in good shape.
- I can only speak for my division. For many years we have successfully attracted and recruited some of the best young biologists coming out of our universities across the nation. Paying strong attention to both technical expertise and potential leadership, has resulted in a staff highly qualified to conduct the science required for good decisions and also the teamwork and leadership required to keep us focused on those pressing resource issues and constituent needs. We are well positioned also in terms of depth of quality employees capable of adequately

filling any expected positions resulting from turnover of an aging staff. Our organizational structure facilitates communication and teamwork needed to adequately address those issues and we have been fortunate enough to acquire state of the art equipment and facilities. In short, the answer to this question is excellent.

- We have all the tools necessary to provide adequate scientific input. The problem we have is the mindset of managing a handful of fish species on an individual lake level using stocking and regulations. Our people need to be thinking more species, larger scale (watershed), habitat management, etc. That's a VERY big change. I feel that we are making progress and are evolving as fast as a state government division can evolve.
- We have good staff expertise but lack sufficient funding (equipment and maintenance), level field with regulatory agencies, and have convoluted team/management organization to address water quantity/quality issues as a result of the reorganization and elimination of the Resource Protection Division.
- The water regulatory arena is not an area that Inland Fisheries has focused on in the past decade, since most of those responsibilities were in the Resource Protection Division. Much of that expertise has now moved into Inland Fisheries and will be directed at those issues. However, developing regulatory sensitivities and knowledge of issues among management biologists working is important since they will be drawn into these issues as water demands increase.
- The agency has placed water and its use as one of its highest priorities. Teams exist to look at it from the macro level (river systems), river segment, lake and biological and chemical components. Staff size and budget increases will be imperative to address the issues 'adequately'.
- Current staffing, organizational structure and facilities are well suited for traditional issues of fisheries management, but likely will not be as appropriate for addressing water allocation issues of the future, as those issues will most likely involve less biology and more social science, policy development, marketing, and constituency education. The issues are changing much more rapidly than we are.
- The Department has a human dimensions position and an aspect of that should be evaluating user conflicts among different segments of the recreational population. This will include issues related to traditional user conflicts (e.g., skiers versus fishermen), but also having to do with issues such as access and habitat management. If we have perceived user conflicts, how do we use science based survey methods and information gathering to address them? Falling back on an approach of managing the fish populations in a vacuum and not recognizing these other issues could result in our role being minimized. For instance, we may be responsible for fisheries management in a reservoir, but a city may decide that boats shouldn't use the reservoir. Or, a city may only want catch and release fishing. Perhaps we should be broadening our creel surveys to deal with other users besides just fishermen. How are some of these water bodies really being used and what are the ramifications for management?
- Staff has good expertise, we are well-organized, and we have good facilities. I feel that growth in our reservoir/river sampling and human dimension programs would benefit us most. We need to find ways to become more "objective-based"

in our sampling approaches and to find ways to free-up staff time to conduct more intensive sampling in critically important areas/fisheries.

- Expertise is available, but organizational structure, funding, and current priorities do not allow maximum efficiency relative to habitat and invasive species issues.
- We have some staff and organization but I don't believe we have yet developed a cohesive plan to address this issue from both a resource and recreational user perspective.
- More staff will be needed to collect the data needed state wide.
- I believe the agency is positioned well, in terms of expertise and structure, to address both water allocation and golden alga issues. Both issues are huge in magnitude and will require cooperative efforts with other agencies, academia, and various outside entities. However, funding for additional staff, facilities/equipment, and research are needed to adequately address the problems.
- TPWD Inland Fisheries is largely focused on managing sportfish. Integration of the former Resource Protection Division may help change the focus to larger habitat and environmental issues, but this would require a major paradigm shift.

INLAND NON-ADMINISTRATIVE--QUESTION 1 RESPONDENTS: 35

What is the greatest strength/impediment in the agency's ability to apply scientific information to resource management?

- **Strength** – Staff expertise. The staff of the TPWD is knowledgeable and capable of collecting and applying the scientific information needed to manage the natural resources of Texas.
- The greatest strength is the caliber of employees, generally. Our personnel are all trained scientists and apply this discipline to the management of fisheries resources. Very little anecdotal information is applied here.
- The greatest strength is the quality of the staff, particularly the field staff who make the day to day decisions regarding resource management activities. We have some of the most highly qualified people in the country in the agency.
- Strength – education of staff and dedication of staff to provide the best fisheries possible.
- Strength – Integrity and professionalism of IF staff.
- Strengths – Up to date equipment, training, and reputation with constituents.
- Strength=Excellent research, management, hatchery, and aquatic staff.
- First, Inland Fisheries is blessed with a very dedicated and motivated staff. A diverse “melting-pot” of talented scientists who, with administrative encouragement and support, have historically been given the latitude to utilize innovative approaches in managing fisheries resources. The availability of good scientifically sound data, interpretation and use of that data when implementing applied management programs, have translated into many successes and achievements in resource management. Constituents are for the most-part satisfied with our fisheries programs and remain confident in the staff.

- Our greatest strength is our people. We have an excellent core of biologists, with not only the knowledge and skills to analyze the data and make the appropriate assessments about what the results are saying, but also they are able to clearly communicate those results to a wide variety of audiences.
- Our technology is also advancing, with many of our data entry methods seeing marked improvement over the past 5-7 years. The biologists are able to get their data entered now in such a way as to be able to return results in minutes or hours where before the turnaround could be months.
- Strength = The good reputation of TPWD
- Strength: Leadership by highest level administrators and excellent reputation with agency commission.
- The greatest strength in TPWD's implementation of scientific information to resource management lies almost entirely on the people involved. Individuals as well as committees and teams within the department do an excellent job of not only critically reviewing new procedures and processes but making things happen after such consideration.
- Strength: TPWD has attempted to standardize information collection on certain species for the specific purpose of resource management.
- Greatest strength is having good trend data over a long period of time collected using standardized procedures.
- Strength=its personnel and random sampling.
- Random sampling.
- I believe our agency's greatest strength in applying scientific information to resource management is a true universal desire to use sound scientific information to make resource management decisions.
- Strength: Administrators desire to use science to help guide them in decision-making, especially if scientific results confirm preconceived ideas.
- Strength: the way data collection and analysis are set up directly relates to decisions managers must make. Not much wasted time and effort.
- The greatest strength is the constant questioning and improving of our methodology.
- Information sharing, data/report reviews, peer critiques – strengths
- The greatest strength is that all staff in inland fisheries are encouraged to participate in or conduct research projects to advance the science. Participation in research encourages individuals to keep up to date on current information and science. If they are aware of it, then they are more likely to apply the information in the appropriate situation.
- The greatest strength is the ability of managers at the local level to direct their sample collection efforts towards problems of greatest concern.
- Our central database gives all personnel access to needed data. I think our Research Branch studies the appropriate research objectives.
- Our greatest strength is that we have very capable researchers on staff within the division. The Heart-of-the-Hills (HOH) Fisheries Science Center provides a staff of researchers that are dedicated to priorities of the Division, unlike most other state agencies that rely primarily on extra-agency researchers. However, having

the HOH has also resulted in very little interaction with University researchers in the state, and I think there are some detriments to that – including a lack of interactions with extra-agency researchers who could offer valuable insights.

- **Impediment** – Although the leadership of the TPWD uses scientific information and stresses the need to “use good science”, it does not demonstrate that such information is critical to resource management. There appears to be a lack of desire to communicate across divisions to develop broad goals with quantifiable objectives and to establish a framework to use science to meet these goals. Without a clear focus on science or agency objectives, resource management decisions are made based on the goals of individual division directors. Such goals frequently focus on immediate needs without considering long-term direction. Often science is not used in these decisions. When science is used, it is typically with data collected for other purposes and only when it backs the decision.
- Impediment=time and precision of estimates.
- Takes too long between data collection/analysis to implementation of regulatory changes.
- The lack of a clear set of interrelated goals regarding our varied challenges in resource management severely hampers our ability to obtain and utilize good data.
- Greatest impediment is the lack of communication of new scientific methods and how to use them.
- The greatest impediment in application of scientific information that I have observed is the difficulty our field staff, and even our HOH research staff, have in gaining access to scientific literature. Access to journal articles and books are limited. But the most severe need is for convenient access to a computerized service which allows for a thorough searching of topics (and authors name, etc.) in major and minor journals, plus access to copies of the abstracts from articles identified by any particular search.
- Weakness: Managers’ special projects take a back seat because of limited staff hours. These projects could have a lot more potential if cooperation was encouraged between TPWD and universities. Also, scientific information in the form of journal subscriptions, library databases, etc. is practically non-existent for field staff.
- The biggest impediment may be assessment procedures, which may not adequately sample the important recreational species.
- Budgetary constraints – we know what we need to do we just can’t afford to do enough of it.
- Our greatest impediment is (as for most natural resource agencies) the need for additional personnel.
- The economy and budgetary restrictions are probably one of our biggest impediments. Severe limits on the number of new vehicles and computers purchased in a year, along with a lack of pay increases for personnel, agency-wide, over a period of years now, is starting to slowly impact operations. At that pace, it can be anticipated that employee retention could drop, and maintenance costs could increase if a change does not occur soon.

- Lack of personnel or too many reservoirs in each district. Management biologists have too many lakes to sample to make impacts on all waterbodies.
- I think the greatest impediment is the large number of water bodies in our districts. Obviously, with at least 10 reservoirs per district, it is very difficult to apply the proper amount of effort. If we spent all our time on one reservoir, we would lose touch with the others and thus not provide current data that may be asked of us by constituents.
- Limited time to gather appropriate information when already charged with a broad range of responsibilities and priorities.
- The greatest impediment is the lack of resources to do the job. Our budget gets cut every year, salary equity is falling behind national averages making it more difficult to attract/retain the most talented individuals, equipment needs go unmet, etc.
- Low manpower / budget - weakness
- The primary impediment to the implementation of critical scientific information remains monetary. More often than not, the failure of the department to successfully pursue a course of action suggested by new scientific information is due to the lack of sufficient financial resources.
- I believe two chief impediments exist to hamper our application of scientific information: 1) political pressure to from special interest groups that often override science-based decisions, and 2) the limited staff, time, and resources to allocate to the needed effort to conduct surveys that collect scientifically sound samples. I think our greatest strength lies in our quality staff and their willingness to be open to improvements in our data collection strategies and methodologies.
- Impede: Over-reliance on social and political concerns when making resource management decisions.
- Greatest impediment is political agendas, which supercede any scientific data
- Weaknesses – Political motives always supersede sound biological data.
- The greatest impediment to a good scientific approach is the meddling of often well-meaning anglers who just want their way with a particular fishery.
- Impediment – sometimes the best management practice is blocked by political reasons.
- Impediment = Sometimes political or sociological factors outweigh scientific information.
- Politics, plain and simple. When decisions are left in the hands of agency personnel I believe we do a tremendous job. However, when issues become political management usually suffers. Fortunately, this is a rare occurrence in Texas.
- Our greatest impediment is the pervasive notion that we can manage our resources top predator down instead of looking at the basic ecology of our systems and relating our resource data bottom up to sport fish management.
- Impediment=Single species(Florida largemouth bass) focus by Division Director making him not as open to research and management of other species.
- Impediment: Administrators do not recognize that unless data come from a study designed to answer a specific question, data collected are often inadequate to

answer the question at hand. Inappropriate use of data is likely a function of the following (a) reactive nature of the agency, (b) unquantifiable objectives, and (c) politics.

- Perhaps the greatest impediment is a pervasive and longstanding habit of establishing objectives that are not measurable (i.e., abstract rather than concrete). There seems to be a general lack of belief in science as an important basis for decisions; intuition and decisiveness are highly valued. This culture places importance on rapid reaction to “unforeseen problems of the moment”... in other words, there is no time for science to work. The perceived success of this approach, reinforces the belief that science is not needed.
- The biggest impediment is pressure from influential organizations or members of the public, as well as top-down directives from within the division. . . Most notably the often stated need for additional hatcheries for the express purpose of increasing Florida largemouth bass production, while other species are largely ignored.
- Weakness: TPWD prefers to produce “good news” information and may avoid realities that are not sufficiently positive.

INLAND NON-ADMINISTRATIVE—QUESTION 2

RESPONDENTS: 36

What is the greatest strength/weakness in standardized assessment procedures?

- **Strength:** TPWD collects vast amounts of standardized information on important sport species and, in most cases, attempts to fine-tune the quality of that data as needed.
- The greatest strength is that the procedures are thoroughly documented, are accepted by our staff as appropriate (ensuring they are followed), and are open for revision when a need is identified.
- The greatest strength in our standardized assessment program is consistent quality data to help us follow statewide trends in sport fish populations.
- Sampling procedures and protocol are TPWD’s greatest strength.
- I think the greatest strength is the standardization. There is enough flexibility to make changes and study specific problems and still monitor our sportfish populations in the reservoirs we are responsible for.
- Again, their greatest strength is the flexibility to allocate effort to address local issues.
- The greatest strength is that we have greater flexibility to tailor assessment surveys to address specific objectives.
- The greatest strength is in consistency and defensibility of our decision-making.
- Strength: Improves efficiency
- Greatest strength is that they are standardized and consistent over time.
- Strength – An obvious strength of standardized procedures is that if procedures are truly standardized, data are comparable. Additionally, if standard procedures are developed and evaluated to meet a specific quantifiable objective, they can

- improve efficiency by determining the best method for collecting needed data. A limitation, however, is that standard assessment should only occur for systems which are similar – Texas systems differ dramatically across the state.
- Our standardized assessment procedures allow us to apply consistent principles and return similar results on a statewide basis, and also to produce comparable results to those agencies in other states following similar standardized procedures.
 - Strengths – Repeatability and comparison of data over time (comparable trend data).
 - Strength – provides comparable datasets over time.
 - The greatest strength is the ability to compare data over time.
 - Strength – allows for better statistical analysis.
 - Strength: I have to sample sites I would not normally sample based on experience and by so doing, our assessment procedure reduces bias and increases statistical validity.
 - I believe the greatest strength lies in the ability to compare data among reservoirs, districts, and regions. With procedures standardized, we can develop a statewide database of information that is comparable.
 - Strength = Random sampling locations allow for comparison among reservoirs.
 - 5-min stations and random site selection of electrofishing sites is a strength.
 - The greatest strength is that data is usable over a wider area for research and management activities.
 - Strength: Compare across systems (which in reality is rarely done).
 - Strength: Data collected using standardized procedures (equipment and procedures) reduces sampling bias and allows for better trend analysis.
 - With the exception of trap netting, the greatest strength is the procedures themselves.
 - Strength=Time flexibility potential of 4-year sample rotation.
 - Strengths – Long history of sampling. Extensive sampling program which is reviewed periodically. Well documented. Professional and experienced staff.
 - Standards to follow aid in completing all steps needed (not overlooking something) – strength.
 - Strength: computerized database makes data available to all managers statewide, and makes analysis relatively quick and easy.
 - **Weakness** – High CVs associated with some sampling methods, indicate a need to increase sampling intensity. Many management districts are currently sampling as intensively as they can with available resources.
 - Greatest weakness is that sample sizes are inadequate for answering some questions with a high degree of precision. At this time our sampling is not as objective based as it could be.
 - Sometimes there are inadequate sample sizes or frequencies to always make strong scientifically based decisions.
 - The biggest weakness is that the sampling effort recommended in the procedures, while fine for routine monitoring, is likely insufficient to answer questions of a more serious nature.

- Weakness: TPWD has preferred to focus on specific species rather than assemblages of species within specific ecosystems, particularly opting to dodge threats posed by invasive exotics and issues that may challenge popular notions or generate critical information.
- Our greatest weakness is a relatively poor habitat database and little desire to elevate habitat data to a level of importance equal to fish population data.
- The greatest weakness is that our district staff have so many reservoirs within their districts that most are not sampled annually, and that logistically-achievable sampling efforts may not ensure the degree of precision our staff would hope to achieve. Of course, this is common to virtually all state agencies)
- Weakness: Many times additional sampling is required to collect adequate sample numbers.
- I think the greatest weakness is the sampling procedures are too random to adequately sample each species. Fish are not randomly distributed in a reservoir. At different times of the year they are usually concentrated in some area of the reservoir. Our sampling is somewhat stratified, but not enough. Many times we sample a certain species in an area of the lake where there is very little possibility of them being there. For instance a sample site is randomly picked that is a sandy or silt shoreline where we would catch very few largemouth bass. To me it makes more sense to identify areas of the reservoir where habitat is suitable for largemouth bass and then randomly select a number of stations to sample the largemouth bass population. It would save time because you would need fewer stations to get enough largemouth bass to adequately describe the population. If you use completely random stations then you will have to sample a lot more stations as pointed out by Dumont and Schlechte in “ Use of Resampling to Evaluate a Simple Random Sampling Design for General Monitoring of Fishes in Texas Reservoirs” (North American Journal of Fisheries Management 24:408-416, 2004. I have the same concerns with crappie. Based on past experience crappie are found in specific habitats in the fall, when we sample for them. Gill netting has similar limitations also.
- Weakness = Random sampling on large reservoirs with limited quality habitat for certain species results in sampling locations that generally don't collect any of the target species (e.g., electrofishing for largemouth bass on bare mud flats with no vegetation). Also, random sampling for crappie results in very low catches because net locations are not in the best locations to catch crappie. Manpower would be better used if trap net locations could be selected by district biologists and used consistently from year to year. In addition, our standardized assessment procedures require us to trap net for crappie at least every 4 years. In some reservoirs, the crappie population is of very low abundance, but we are required to sample them. For example, a trap net survey earlier this week did not catch a single crappie. This activity required about 12 man-hours when the time could have been spent better someplace else.
- Weakness: totally random sampling often leaves managers with too small of a sample size to calculate important parameters.
- Weakness=Total random sampling station selection design.

- Weakness – could focus too much effort in areas where specific fish species are not found, artifact of true random sampling versus random stratified.
- Sampling station selection is a major weakness. Currently, stations are chosen randomly. However fish species are not randomly distributed in a reservoir. TPWD needs to move to stratified random sampling.
- The use of complete random sampling; field personnel should be able to use stratified random techniques in order to gather more reliable management data from fish populations in habitats that are more representative of those fishes requirements.
- One weakness is that our standard fish population monitoring surveys should be done using a stratified random sampling scheme rather than the current simple random scheme.
- The greatest weakness in the standardized assessment procedures is the variability it creates in catch rates. Many of our lakes have limited areas of suitable fishery habitat for sport fish. If the random selection of sampling sites results in many mud banks, the CPUE of gizzard/threadfin shad may be inflated, while the CPUE of largemouth bass may be underrepresented.
- The greatest weakness is their application; randomized or stratified sampling, in my estimation, is not in concert with fisheries resources. Fish are not randomly distributed. Now back to trap nets, for some reason they fail to produce consistent catches of crappie (for which they are designed) for us. We read in the literature where other states agencies are successful with this gear, but alas success has eluded us in Texas.
- Random sampling with gill nets and trap nets is a disaster. Our precision of creel estimates of catch rates is very low; sample size of creel surveys and people power needed to do appropriate sample sizes needs to be addressed.
- The primary purpose of standardized assessment procedures is to allow equitable comparison between reservoirs and simplify analysis. Although that in itself is its greatest strength, the overriding weakness is the assumption all reservoirs and their fish populations are enough alike to be comparable. Standardized assessment procedures are very powerful under the proper static circumstances but simply will not apply to dynamic systems inherently unique from one another.
- The greatest weakness is the assumption that the same sampling design can be used effectively over the entire state. One example would be random sampling. In east Texas, fish habitat is similar over the entire reservoir so it really does not matter where you sample – you will get fish. In west Texas reservoirs, habitat is very spotty. Random sampling locations could result in surveys conducted in a lot of fishless habitat. The logic for random surveys was presented as “you are managing the entire reservoir, not just the good habitat.” I would contend that I am managing the population, not the reservoir, and to do so I need accurate information on the population – especially the population the anglers know how to target.
- The greatest weakness is the difficulty in setting standards that are equally applicable in a state with the environmental diversity that is present here in Texas.
- Weakness – Unfortunately, standard assessment procedures are applied to vague objectives without evaluation. This results in the collection of data that are not

used for any specific purpose. The objective of collecting such data becomes “to meet the standard requirement”. Within Inland Fisheries, we have fallen victim to this process. Most of our standard assessment procedures are required, yet the data collected are often not used or inadequate to meet true objectives.

Additionally, because we have essentially standardized objectives, many of our managers no longer question the methods used and therefore little effort is made to improve them.

- Weakness – standardization seems to be a reactionary tactic, implemented to control proliferation of data, rather than as a means of collecting data needed for specific, agreed-upon objectives.
- Weakness – Biologists lose their ability to take advantage of their “feel” for the resource.
- The greatest weakness lies in people getting complacent in performing minimum effort and standard tasks, and failing to investigate or striving to push for improved strategies or methodologies. Standardized procedures are needed along with the flexibility to go beyond minimum standards or break the bureaucratic inertia and continually find better methods.
- Weakness: In the absence of good practical judgement skills, safety issues could develop (particularly electrofishing) during sampling. Restricts biologist from deviating for prescribed procedures where customization might be more practical and appropriate.
- Weakness: May create a “do only the minimum/standard attitude.”
- Weakness: Entices biologists and administrators into a model where thinking is optional and any data are good data.
- Trying to apply a standard procedure to any objective just because the standard exists and not because it is the best procedure – weakness.
- Weakness – Lack of flexibility that takes away from objective-based management.
- Although standardized assessment procedures provide for continuity of data over time, they create a lack of flexibility to answer specific or unique questions.
- The drawback is that from time to time, specialized alternatives are needed to answer specific questions about our fish populations that our standardized procedures may not adequately.
- The greatest weakness is that there are occasions that what works in one area of the state does not work in another. Flexibility is needed sometimes to achieve your goal when standardized methodology does not work.

INLAND NON-ADMINISTRATIVE--QUESTION 3

RESPONDENTS: 35

What is the most pressing issue anticipated in the next 10 years that will require science-based input from the agency?

- Texas has far too little water and manages water issues with archaic concepts and good-old-boy and big-money logic. This issue will strike not only sport and

commercial fisheries in the future, but will be especially problematic for rare and declining non-game species that have often been all but ignored in Texas.

- Water allocation.
- Water quality and allocation.
- Acquisition and allocation of water; Outreach to the Hispanic population.
- Water use issues and how the future of fishing fit into the picture.
- Water allocation for fishing and the economic impacts of fishing on local and state economies.
- As the demand for water increases with the population, water rights for recreational purposes will be one of the biggest issues we face in managing the fisheries of our state.
- Balancing land and water allocation desires of our growing human population with the land and water allocation needs of our natural world.
- Water availability, its use and making sure wildlife and fisheries needs are considered in the planning.
- Availability and allocation of water resources within the state.
- Water quantity and quality.
- Simply put, water. Availability of water resources in Texas can potentially override any management efforts that our agency might exercise. Ensuring adequate water resources will require the use of scientific information that fisheries management agencies have not traditionally utilized to the extent I believe we will require in the future. Specifically, for our traditional fisheries management actions to continue as feasible strategies, we will require accurate estimates of the value of our fisheries (in both monetary and intrinsic senses of “value”) so that our agency can make a case for appropriate consideration of fisheries issues to the controlling authorities that make decisions pertaining to water availability.
- More than all other issues combined, documenting the importance of water for natural resources is the issue that must be addressed.
- Water conservation with a growing population and insuring that there is enough water for the biota.
- Allocation of water resources to human and wildlife needs.
- I believe that the regional water planning that will occur across the state will require defensible, science-based data to determine not only the recreational value of fisheries, but the value of allocating water to be devoted for the needs of fish and wildlife.
- Water. Specifically water quantity and quality and how water allocation and land-use practices affect aquatic resources. Allocation of water resources to conflicting uses; I.E., industrial, municipal, recreational, ecosystem function. The agency will participate in water allocation issues. Questions put to the agency will require specific knowledge of the relation between fishery health and water quality and quantity.
- Probably in-stream flows in rivers and streams.

- Water allocation for sports fishing will be the biggest fight in the next 10 years I believe. Another issue will be fish kills. Golden alga problems and LMB virus are examples. Getting minorities to participate in fishing will be an issue, too.
- Depending on one's area of study and expertise, potential problems in the next 10 years that require significant agency involvement could range from availability of sufficient water resources to global warming. However, our primary problem in the next 10 years will be directly related to ever-increasing population growth and subsequent demands on finite natural resources and habitat.
- Human population growth (expected to double in Texas by 2030) and increasing demands for water and other natural resources will negatively impact aquatic and terrestrial habitats. Increases in population growth and reduction in aquatic and wildlife habitat will translate into increases in recreational pressure/demand on existing habitats. The challenge will be to minimize man-made impacts on aquatic and terrestrial habitats while continuing to meet the recreational needs of our constituents.
- The continued aging of our reservoirs, demand for water, and increased effluent will all work against improving sportfish populations and protecting non-game aquatic species in reservoirs and rivers.
- Maintaining water quantity and quality in manners that prevent biological magnification of pollutants. Magnification could result in restrictions on utilization of resources for recreation or consumptive activities.
- Conservation of water resources and habitat.
- Habitat and golden algae.
- The apparent proliferation of golden alga *Prymnesium parvum* in Texas waters and the second most pressing issue will be the value of an acre of water to fisheries resources as reflected in the value of an angler-day of fishing.
- The most pressing issue that I anticipate in the next 10 years is the golden alga issue. It has already caused many devastating fish kills. One major issue linked with this is the inter-basin transfer of water by river authorities and water control districts.
- Golden alga effects on aquatic resources, causes of the problem, and solutions.
- Toxic algal bloom mitigation and management and water for wildlife and fisheries.
- Changing demographics, from a conservation standpoint (current) to a more harvest oriented standpoint.
- Decreased participation in angling and poor recruitment of replacement anglers.
- Recreational angling has been declining and could continue to decline as additional pressures from animal rights groups, opposed to sport fishing, exert influence over individuals considering the sport. This will require good socio-economic data to support our position that sport fishing is good not only for the resource, but for society as well.
- Fish stocking decisions concerning needs, species, rates, sizes and how to prioritize.

INLAND NON-ADMINISTRATIVE--QUESTION 4
RESPONDENTS: 36

To what extent is the agency positioned, in terms of staff expertise, organizational structure, and facilities, to provide adequate scientific input to the most pressing resource issues anticipated over the upcoming 10 years?

- Generally, staff expertise and facilities are sufficient to address issues related to sport and commercial species. Our organizational structure and particularly poor in-house communications will continue to pose bureaucratic challenges which will be aggressively resisted by headquarters administrators. Our greatest short fall will be with experts and information on declining non-game species and invasive exotic organisms. Years of heel dragging in these areas will create major problems in the years ahead.
- No doubt, we are set up to get the job done.
- I think we are better-prepared in Texas than in many other states that are facing limited water resources, but still have inadequate available resources in relation to the magnitude of the issue. Our current in-house staff have some expertise concerning these issues, but I think stronger relationships with extra-agency personnel possessing expertise in water resource issues will be needed to adequately address our needs.
- I think key members of our administrative organizational structure recognize the centrality of these issues to our future operations, but I'm not sure we yet realize the degree to which water resource issues may have on the management options we may exercise.
- Moving resource protection personnel to Inland and Coastal Fisheries will help.
- Several years ago Inland Fisheries staff members began putting together a 10 year strategic plan in an effort to address that question. Goals and strategies to attain those goals (9) are listed in that plan.
- TPWD, in my opinion, is probably more prepared than many of its counterparts to meet the challenges the next 10 years may offer. The present organizational structure appears not only adequate but flexible and willing to improve as the need arises. TPWD staff display a high degree of professionalism in their areas of expertise. Although some facilities are barely sufficient for their intended purpose, just as many are either under renovation or earmarked for improvement.
- In terms of staff, facilities, and structure, we could be in good shape to meet the issue of losing our constituent base. Our problem is we are so focused on Florida largemouth bass and the people willing to pay the expense of being competitive non-consumptive anglers that we are not addressing the change in American demographics and the unwillingness and/or inability of the majority of households (and individuals) to spend that amount of money for recreation.
- I think the agency is in good shape for taking care of these problems.
- The agency, in my opinion, has positioned itself nicely to address these issues.
- I believe the agency is currently well prepared to provide scientific input and will continue its quest to collect data that will enable it to address important issues as they arise.

- I believe we are in pretty good shape given the work we have conducted with instream flow needs in our river basins and the collaborative work we do with other regulatory agencies involved with water quality.
- We are adequately positioned.
- We've recently reorganized and have identified many of the future challenges ahead. I believe we are well positioned for the future.
- Satisfactory for all.
- Staffing is adequate.
- Our agency has the staff expertise to address the issues regarding water quality and water allocation. I believe we need to better integrate our staff resources through our leadership to address questions of basic system ecology. As a fisheries management biologist it is my belief that we must begin to look at our reservoir fisheries as part of an ecosystem including aquatic and riparian habitat, water quality, and water use regimes.
- Current staff are generally well-trained. However, districts cover a large area with many waterbodies to sample. Small district crews limit the amount of sampling that can be conducted within any given year. Districts should be made smaller for existing crew size (this would mean adding additional districts to the division), or district crews should be enhanced with more employees. Currently there is a District biologist, an assistant biologist, and two fisheries technicians. The addition of a technician and another assistant biologist would greatly increase the amount of fieldwork and subsequent analysis that could be done.
- The division has a lot of quality people, but we can always do better. I believe the organizational structure is good (as long as the legislature quits messing with it). Most facilities (management, research, hatcheries) are outdated and insufficient to meet the increased demand for additional programs, research, and stocking. More personnel will be needed as the population in Texas is scheduled to almost double in the next 20 years, yet the strategic plan does not adequately address this shortfall. Budgets for field operations are feeling the squeeze and some monitoring at the district level is already being curtailed due to lack of funding. The legislature also drastically limited new vehicle purchases starting a few years back and if things don't change soon, just getting to a location to sample will be our biggest concern.
- TPWD is in a great shape for the next 10 years. However the upper management will have high turnover in the next 10 years thus experience at the higher positions will be lacking.
- Texas Parks and Wildlife is very well equipped with quality personnel and technologies to adequately access and add input on future issues.
- Overall, I think we are well positioned to deal with whatever may come up. We have a very forward thinking group of people that are good at anticipating future challenges and preparing ahead of time to meet them. We do need some additional source for funding, so that we can stay ahead of the curve in regards to technological and logistical demands that will arise with these new challenges.
- I think the agency is well staffed with good and young personnel to meet future needs, but there is a large contingent of staff retiring very soon.

- The agency is adequately positioned, but must improve its vision and internal coordination to properly utilize its scientific potentials.
- I think we are positioned fairly well but I believe we need to work to get more legal muscle for requiring minimum in stream flows for wildlife.
- Probably adequate if directed and working on what the greatest needs actually are.
- Staff expertise and facilities are likely adequate (but could be better) to provide the scientific input needed regarding water. However, the position of TPWD's leadership and our organizational structure will likely limit our ability to gather the scientific information necessary to manage water in Texas. TPWD's mission and organizational structure disproportionately emphasize traditional users such as hunters and anglers while largely neglecting non-traditional users such as canoeists, birders, rock climbers, and cyclists. As a result our focus tends to be on specific species (e.g., whitetail deer and largemouth bass) rather than on the management and conservation of critical habitat, including water. For fisheries, our focus needs to shift from specific species of sport fish to the watersheds which they depend. Doing so will provide an opportunity to manage and conserve our aquatic resources for all users. However, such an approach will likely require the reorganization of our staff in such a way that staff expertise from all divisions is shared.
- We have the expertise to address these issues; however, we will not be able to continue doing things "just because we did them before". This will require that our leadership is willing to make difficult decisions regarding allocation of our budgetary and staff resources AND that the staff is willing to be flexible enough to change with the new direction.
- I believe we will have to be flexible in our thinking over the next decade in terms of managing the waters of this state. No doubt the expertise is there right now to take on any challenge, but we may face further organizational changes down the road and we will continue to need to maintain and upgrade our facilities periodically in order to keep up with the demands that we face.
- The agency's (and division's) focus is outdoor recreation, and its paradigm is that if it can get people enjoying the outdoors, it can use that population to push its conservation mission. While pragmatic (since funding comes through license fees), this approach is specious, as it supposes that recreationalists want conservation. However, if the current population of recreationalists can be used as a guide, what recreationalists want is the best recreational opportunity, regardless of the ecological ramifications. This manifests itself in the importation of fish and game from outside their native range; and the promulgation of rules, and alteration of land and water, to accommodate species of highest recreational interest. This is driven, not by a conservation ethic, but by a recreationalist-economic ethic. All aspects of the agency reflect this paradigm, instead of reflecting the truly pressing resource issues. This paradigm further manifests itself in the organizational structure of TPWD. The most pressing needs exist across the artificial boundaries that the agency has established as its divisions and regions. Divisions have been created to direct effort into the core recreational avenues, although their names have been chosen to reflect ecological principals – parks, hunting/wildlife, freshwater fishing/inland fisheries, and marine

fishing/coastal fisheries. Notice how Resource Protection, a division without a recreational tie-in, has been dissolved. More integration is necessary, a conservation ethic needs more emphasis, and agency boundaries need to reflect true ecological boundaries.

- Golden algae...very good. Habitat very poor.
- TPWD seems to be putting a substantial effort into the golden alga problem. However, more cooperation within the agency and with outside institutions is needed to expand the scope of the work being done, and speed up the pathway to possible solutions.
- I feel we were a little bit behind in this until just recently. The Legislature recently appropriated funds specifically to address this issue. Until now, there has been very little known about golden alga. We now have people conducting research on it and should make large strides in understanding it in the near future. As far as staff expertise, I think we are hiring qualified people with a diversity of skills and expertise from across the nation. As far as organizational structure, I can't think of any gaps or holes that need filling or issues on the horizon that don't have some group or person to address them. Most of our facilities are in fair to good shape and we are addressing the renovation of some of our fish hatcheries at the present.
- I think we are in excellent shape. The Texas Legislature has allotted \$1.2 million over the next two years to get a handle of golden alga and we are about doing that. We are conducting creel surveys on our fisheries obtaining not only fish harvest data, but economic data related to how much an angler-day of fishing is worth in Texas. We just need to press on in both areas.
- The agency is poorly positioned in terms of allocation of resources, in that for example, there will be more resources (staff and funds) directed to hatchery production than to assessment of fishery needs for water (i.e., how much water, when, and for what purpose). Additionally, special projects and research within the Inland Fisheries Division will probably continue to focus on refining standardized sampling and assessing fishing regulations.