

Okaloosa County

Project Data Collection Form

RESTORE ACT - Direct Component

BCC Proposal Number

(To Be Assigned by Grant Administration)

INTRODUCTION

The purpose of this data collection form is to assist Okaloosa County in prioritizing projects submitted for Direct Component ("Pot #1") funds allocated from the Gulf Coast Restoration Trust Fund through the Resources and Ecosystems Sustainability, Tourist Opportunities and Revived Economies of the Gulf Coast States Act of 2012 (RESTORE Act).

The following terms are used in this data collection form:

- Applicant or Responsible Entity - the Okaloosa County Board of County Commissioners (BOCC)
- Project Proposer - the individual or organization completing this form

Prior to initiating this data collection form, it is recommended the Project Proposer download and review the entire form to understand the range of required information. Tools/data required to complete this form may include: permits, interlocal agreements, comprehensive plans, evidence of property ownership, and estimated project costs. Completing all required information in the collection form may require many hours; this will be a function of project complexity and proposer preparedness.

This data collection form differs from the U.S. Treasury Application Form (RESTORE Act Direct Component Guidance and Application to Receive Federal Financial Assistance; August 2014). This data collection form is designed to assist Okaloosa County in their task of developing a recommended list of potential projects for inclusion in an amendment to the BOCC's Multiyear Plan.

Projects that are identified for funding in the Multiyear Plan amendment may require additional information from the Project Proposer. If a proposed project is ultimately included in the approved Multiyear Plan, failure of the Project Proposer to provide the required project information may preclude funding for that project.

Per RESTORE Act guidance, the responsible entity shall be solely responsible for the execution of each funded project, including procurement of professional services and/or construction services. The Okaloosa County BOCC reserves the right to delegate these services to sub-entities with the demonstrated capability to comply with all County and Federal procurement processes required by the RESTORE Act.

By proposing a project through this data collection form, the Project Proposer acknowledges there is no guarantee the proposed project will be funded. Further, the Project Proposer acknowledges no reimbursement or compensation shall be provided for completing the data collection form or any other activities associated with proposing a project.

PART A: GENERAL INFORMATION

Incomplete applications will not be considered. By submitting this project proposal, the proposer certifies that the statements herein are true, complete and accurate to the best of his/her knowledge. Any false, fictitious, or fraudulent statements or claims may cause the application to be rejected without the opportunity to re-submit.

A.1 Project Point of Contact: Provide the name and contact info including the mailing address, e-mail address and phone number of the Project Proposer.

Name:	Keith Williams
Street 1:	10 Yacht Club Drive
Street 2:	
City:	Cinco Bayou
State:	FL
Zip Code:	32548
County:	Okaloosa
E-Mail:	keith@cincobayou.com
Phone Number:	850-833-3405

A.2 Proposed Activity / Project Name: Provide the name of the Proposer Activity/Project

Glenwood Park Stream Restoration and Stormwater Retrofit

A.3. Requested Funding Amount: How much Direct Component (Pot #1) funding is being requested for this project?

\$620,000.00

A.4. Qualifying Eligible Activity: Please check the primary eligible activity in the first column and then all other eligible activities that apply in the second column by placing a check mark or selecting the radio button in the column in the row corresponding to the qualifying eligible activity.

Select Primary Activity (Select only one)	Select All Others That Apply	Qualifying Eligible Activity
<input type="radio"/>	<input type="checkbox"/>	1. Restoration and protection of the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches and coastal wetlands of the Gulf Coast Region
<input type="radio"/>	<input type="checkbox"/>	2. Mitigation of damage to fish, wildlife and natural resources
<input type="radio"/>	<input type="checkbox"/>	3. Implementation of a federally approved marine, coastal, or comprehensive conservation management plan, including fisheries monitoring
<input type="radio"/>	<input type="checkbox"/>	4. Workforce development and job creation
<input type="radio"/>	<input type="checkbox"/>	5. Improvements to or on State parks located in coastal areas affected by the Deepwater Horizon oil spill
<input checked="" type="radio"/>	<input type="checkbox"/>	6. Infrastructure projects benefitting the economy or ecological resources, including port infrastructure
<input type="radio"/>	<input type="checkbox"/>	7. Coastal flood protection and related Infrastructure
<input type="radio"/>	<input type="checkbox"/>	8. Planning assistance
<input type="radio"/>	<input type="checkbox"/>	9. Promotion of the consumption of seafood harvested from the Gulf Coast Region
<input type="radio"/>	<input type="checkbox"/>	10. Promotion of the consumption of seafood harvested from the Gulf Coast Region

A.5. Claimed in Oil Liability Trust Fund After July 6, 2012: Was this proposed activity included in any claim for compensation paid out by the Oil Spill Liability Trust Fund after July 6, 2012?

- No.
- Yes. (STOP) This activity is not eligible for RESTORE Direct Component.

A. 6. Location of Activity: Provide the project location. (If there is more than one location for the activity, attach a list of the additional locations).

A.6.1. Address: Provide the actual address for the activity (street address, city/town, county/parish, state, zip code). (If there is no street number, provide the nearest intersection, or note boundaries on map submitted with [Question A.6.2.](#)

Latitude/Longitude (if available):	30D25'19.6"N/86D36'25.84"W
Street Address:	Opp Blvd
City/Town:	Cinco Bayou
County/Parish:	Okaloosa
State:	Florida
Zip Code:	32548

A. 6.2. Map: Provide a map of the project location and describe how the proposed activity will be carried out in the Gulf Coast Region as defined in 31 CFR 34.2.

See attachment A. The proposed project will be constructed within Town limits.
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(END OF PART A)

PART B: PROJECT DETAILS

B.1 Proposed Scope of Work: Provide a detailed scope of work that fully describes the project or program for which funding is requested. Including:

- Need, purpose and objectives;
- How the project/program meets the identified primary activity designated in **A4**;
- Specific tasks, milestones and related timeframes (**also captured in Milestones Report**); and
- Description of all funding sources.

NOTE: The RESTORE Act requires projects designed to protect or restore natural resources to be based on Best Available Science (BAS). (**Complete Question B.4 also.**)

If additional space is needed attach document. (2,000 characters max)

The primary objective is to restore the stream by reducing sediment inputs, removing impoundments, and allowing for the restoration of natural stream flow condition to treat urban runoff which will simultaneously create suitable fish freshwater habitat. The Scope of Work will consist of providing a design to restore natural stream channel; reconnecting upper and lower stream systems, reducing sedimentation, and greatly improving fish and wildlife habitat. The Town expects 90 days from the Notice to Proceed in order to submit design plans and specifications to Florida Department of Environmental Protection and the Army Corp of Engineers. In addition, the Town estimates 90 days in order to complete construction of the proposed project.

B.1.1 Part of a Larger Project: If the proposed project is part of a larger project outside the scope of this proposal, describe the larger project and the proposed project's relationship to it.

The proposed improvements are not part of a larger project outside the scope of this proposal.

B.2 Monitoring: During the project & following its completion, will the project be subject to a monitoring program to evaluate project success?

- No
- Yes (provide information on monitoring and evaluation)

Project effectiveness monitoring will be provided in order to demonstrate the environmental benefits of the Glenwood Park Stream Restoration. Evaluation stations will be installed to take measurements once prior to BMP implementation and annually after BMP implementation for a period of three years. The pre and post difference would demonstrate project effectiveness.

B.3 Management/Maintenance Program: Will the project be subject to a management/maintenance program to ensure project success?

- No
- Yes (Provide information on how the project will be monitored and maintained as well as the party (or parties) responsible for performing these tasks.)

The Town of Cinco Bayou employees will be responsible for the monitoring and maintenance of the proposed improvements. We propose that the effectiveness of the baffle box be determined by weighing the debris captured by the box, following seven to ten storm events with total rainfall between 1.5 and 2.5 inches. The debris captured would also be categorized and tested in order to estimate the load reduction by constituent. In order to demonstrate the effectiveness of implementation of stream restoration, we proposed to set up two evaluation stations where stream cross-sections dimensions, depth of disturbed sediment and habitat assessments and rapid bio-reconnaissance would be measured.

B.4. Best Available Science (BAS), if applicable

Is the proposed activity designed to protect or restore natural resources?

- No Yes (If “yes” complete this section).

B.4.1 Protection or Restoration Objective(s) of the Project– State clearly the objective(s) below:

The proposed project would restore the natural stream channel within Glenwood Park. The primary source of channel instability and observed impairments for the Glenwood Park Stream are a direct result of negative urban stormwater runoff practices. Address the quantity and quality of stormwater runoff should be at the forefront of the restoration.

B.4.2 Methods Used to Achieve Objective(s) – Describe below:

Restoration of the Glenwood Park Stream is recommended for the approximately 1,000 linear foot reach to Yacht Club Drive applying the principals of the Natural Channel Design. A restoration project following the Natural Channel Design method consists of restoring a stream to a stable dimension, pattern, and profile that miminc the natural condition

B.4.3 Methods Based on BAS – Explain in detail how the methods are based on BAS:

The method that will be used to restore the stream back to its natural conditions is the least effasive way to complete the project. It will not cause additional impacts to the surrounding wetlands.

B.4.4 Peer Reviewed Information – Summarize the peer-reviewed information that justifies the proposed objective(s) including methods used for the proposed activity below:

The stream restoration includes re-establishing a single thread channel from the existing braided system, installing woody matieral to control the channel grade as well as protect and armor the streambanks from erosion, and removing all non-native plant species and re-planting native vegetation along the riparian corridor and associated floodplain.

B.4.5 Alternative Scientific Information Sources – if Peer Reviewed information is unavailable; explicitly stated this and provide a brief explanation of what sources were used. If sources are publicly available, please also provide a link below:

A summary of existing conditions is included as Attachement B.

B.4.6 Literature Sources Used for BAS – if applicable, list the sufficient citations including: Title, Journal in which the literature source appeared, if applicable; Publication date; Author(s); and Web address if downloaded or available online that would apply to the proposed project **B4.4.1**

A summary of existing conditions is included as Attachement B.

B.4.7 Conclusion of Literature Sources in B4.6– Summarize the literature sources’ conclusions and any uncertainties or risks in the scientific basis that would apply to the proposed project including any uncertainties or risks that were identified by the public or by a Gulf Coast Ecosystem Restoration Council member below:

A summary of existing conditions is included as Attachement B.

B.4.8 Gulf Coast Region adaptability, if applicable – Summarize how the method’s used reasonably support and are adaptable to the Gulf Coast Region if the information supporting the proposed project does not directly pertain to the Gulf Coast Region below:

The proposed project does direct pertain to the Gulf Coast Region.

B.4.9 Evaluation of Uncertainties and Risks – Summarize an evaluation of uncertainties and risks in achieving the project’s BAS objective(s) over the longer term. For example, is there an uncertainty or risk that in 5-10 years the project/program will be obsolete or not function as planned given projections of sea level rise or other environmental changes such as in freshwater inflows to estuaries?

With the proper maintenance, the proposed project will be sustainable once constructed.

B.5 Project Narrative

Provide a narrative of your project and why this project should be funded. Discuss the following items as a minimum:

1. Explain how the proposed budget supports the proposed scope of work
2. Project Expenditures (long term and short term)
3. Project Revenues
4. Program Income, including nature and source, if any
5. Key personnel involved with the project
6. Will a subrecipient be required to complete the project
7. Specific objectives
8. Permits or land acquisition required
9. Design status
10. Similar project success or if new technology explain
11. Environmental impact (species affected, existing plans supported, etc.)
12. Risks to implement and maintain the activity
13. Jobs Created (short term, long term, and wage scales)

(1,000 characters max)

The Glenwood Park Stream Restoration proposal includes stormwater retrofit best management practices (BMP) adopted from adjacent waterbodies and their watershed management plans. The funding for this proposal will be used to develop construction plans and to build the project, which will include, a baffle box and implementation of a stream restoration plan to improve the water quality of Cinco Bayou.

The primary source of channel instability and observed impairments for the Glenwood Park Stream are a direct result of negative urban stormwater runoff practices. Addressing the quantity and quality of stormwater runoff should be at the forefront of the restoration process. The baffle box will be designed to trap and remove floating trash and debris that is transported to the creek during storm events and inevitably Cinco Bayou. The baffle box will reduce total suspended solids and organic loading in the stream and Cinco Bayou. Implementation of the stream restoration plan will reduce the amount of sediment suspended in the creek during storm events and may consequently improve biological impairment.

Over the last several years, greater and greater demands have been place on the Town of Cinco Bayou to control its urban rainfall runoff or stormwater. These demands have come from State and Federal agencies as well as numerous local residents and businesses. To address its stormwater management needs, the Town of Cinco Bayou has developed a Stormwater Management Master Plan. The proposed improvements were ranked the top priority in the final report. All conceptual design has been completed. Permits related to the project will be submitted once the construction documents have been completed.

There are currently no risks associated with the proposed improvements. A risk to water quality currently exists if the project is not constructed. Restoring the stream back to a natural condition will provide the Town with a system to treat the majority of urban runoff that is creating issues for residents and businesses. Expected expenditures will not exceed the maintenance allocation that is included in the existing budget for the Town.

Town employees will be responsible for the maintenance and monitoring of the completed project. The primary point of contact will be Keith Williams, City Manager. The Town is capable of perform the tasks expected by the program manager. A subrecipient will not be required to complete the project.

B.6 Project Budget

In the “Project Budget” table, provide best estimates of the costs and revenues associated with the proposed project during the period of performance.

There are two Project Budget tables below, one is for “Non-Construction” and the other is for “Construction”. Both mirror the budget format required for the forthcoming grant application. Complete the one that best pertains to your project.

Expenditures – Line 6.(a-g) – Section B

For each expenditure entered, it must be associated with a task as listed in the scope of work. You will be required to describe and justify the expenditure in the section that follows.

Indirect Charges – Line 6.(i). (if applicable)

Indirect cost rate (if applicable) as determined by 2 CFR Appendix to Part 200.

Program Income – Line 7 (if any)

Program Income means gross income earned by the Non-Federal entity that is directly generated by a supported activity or earned as a result of the Federal award during the period of performance except as provided in §200.307 paragraph. Enter the estimated amount of income, if any, expected to be generated from this project. Do not add or subtract this amount from the total project amount. In the project narrative define the nature and source of income. The estimated amount of program income may be considered by the Federal grantor agency in determining the total amount of the grant. See 2 CFR §200.80 for more details.

Non-Federal Resources – Lines 8-11 – Section C

Restore Direct Component funds DO NOT require matching funds. Enter the total amount of RESTORE Direct Component funds that will be need to execute your project in column 1 Federal. **However, if you are receiving matching funds from other sources to complete your project, the source of those funds will be listed separately in column a. on lines 8-11 and the respective amounts in columns b.- e.**

For example, if you are proposing a \$2 million construction project and are asking for \$1 million from RESTORE Direct Component to match a \$1 million, you would enter \$1 million from RESTORE and \$1 million in non-Federal for the Proposer. However, once proposed, accepted and awarded by Treasury, the \$1 million in non-Federal proposed funds would then become a required cash match from the Proposer.

Use current year dollars rounded to the nearest dollar.

(“Project Budget Information table” is on the next page)

B.6.1 Non-Construction Project Budget table

PROJECT BUDGET INFORMATION – Non-Construction Programs					
SECTION B – BUDGET CATEGORIES					
6. Cost Classification	(1) Federal	(2)	(3)	(4)	(5) TOTAL
a. Personnel					
b. Fringe Benefits					
c. Travel					
d. Equipment					
e. Supplies					
f. Contractual					
g. Other (specify)					
<input type="text"/>					
<input type="text"/>					
h. Total Direct Charges (sum a-g)					
i. Indirect Charges					
j. TOTAL (sum a-i)					
7. Program Income (see 2 CFR §200.80)					
SECTION C – NON-FEDERAL RESOURCES					
(a) Identify Funding Source: <i>(Note: No Matching Funds are Required)</i>	(b) Proposer	(c) State	(d) County	(e) Other	(f) TOTAL
8. <input type="text"/>					
9. <input type="text"/>					
10. <input type="text"/>					
11. <input type="text"/>					
TOTAL (sum of lines 8-11)					
<i>Reference: OMB Standard Form 424-A</i>					

B.6.2 Construction Project Budget table

PROJECT BUDGET INFORMATION – Construction Programs					
SECTION B – BUDGET CATEGORIES					
Cost Classification	(1) Federal	(2)	(3)	(4)	(5) TOTAL
1. Administrative and Legal expenses					
2. Land, structures, right-of-way, appraisals, etc.					
3. Relocation expenses and payments					
4. Architectural and engineering fees	\$85,000.00				
5. Project inspection fees					
6. Site Work					
7. Demolition and Removal					
8. Construction	\$515,000.00				
9. Equipment					
10. Miscellaneous – Monitoring	\$20,000.00				
11. SUBTOTAL (sum of lines 1-10)					
12. Contingencies					
13. SUBTOTAL	\$620,000.00				
14. Program income - (see 2 CFR §200.80)					
15. TOTAL PROJECT COSTS (subtract 14-13)	\$620,000.00				
SECTION C – NON-FEDERAL RESOURCES					
Identify Funding Source: <i>(Note: No Matching Funds are Required)</i>	(b) Proposer	(c) State	(d) County	(e) Other	(f) TOTAL
a. <input type="text" value="N/A"/>	N/A	N/A	N/A	N/A	N/A
b. <input type="text" value="N/A"/>	N/A	N/A	N/A	N/A	N/A
c. <input type="text" value="N/A"/>	N/A	N/A	N/A	N/A	N/A
d. <input type="text" value="N/A"/>	N/A	N/A	N/A	N/A	N/A
TOTAL (sum of lines a-d)					
<i>Reference: OMB Standard Form 424-A</i>					

B.6.3 Budget Justification

Explain in detail how the above proposed budget supports the proposed scope of work. Provide specific justification for ALL project budget categories that apply, including a justification of how the proposed costs within each of the budget categories on the above SF-424A are necessary, reasonable, allowable, and allocable. (2,500 characters max)

The services listed in the budget form above are broken down as follows:

Engineering: \$85,000.00

This task will include the surveying and preparation of construction documents. The topographic survey of the existing conditions on site will meet the Minimum Technical Standards as prescribed by the Florida Board of Professional Land Surveyors in Chapter 61G17-6 FAC, pursuant to Section 472.027, Florida Statutes. The construction document preparation will include the preparation of a set of construction documents based upon the approved conceptual plan.

Construction: \$515,000.00

The construction includes restoration to the existing stream and the installation of a baffle box.

Monitoring: \$20,000.00

This task will be completed by Town employees. The monitoring will demonstrate the project effectiveness.

B.7 Real Property or Land

B.7.1 Property Ownership/Use: If project requires the use of land, provide details of property to include land acquisition, ownership, agreements to use property, permits, easements, etc.

The Glenwood Park was dedicated by plat. No additional acquisition will be required to complete the proposed project.

B.7.2 Attach documentation (i.e. letter of commitment, Memorandum of Understanding, deed, etc.)

B.7.3 Land Acquisition: Will land or interest in land be acquired?

- Yes, answer questions [B.7.5 – B.7.12.13](#)
 No

B.7.4 Land Improvements: Will land be improved?

- Yes, answer questions [B.7.5 – B.7.10, B.7.12.4](#)
 No

B.7.5 Legal Rights: What are the legal rights that will be acquired?

- Fee Title Easement Other (explain):

B.7.6 Easement: If an easement, what is the life or term of the easement?

B.7.7 Title: Will the **Project Proposer** hold title to the land? Yes No

B.7.8 Land Size: What is the total acreage of the proposed property interest to be acquired (easement or fee title)?

B.7.9 Appraisal: Has a recent certified appraisal of the property been obtained?

- No
 Yes (attach a copy of the appraisal)

B.7.10 Title Opinion or Certificate: Has a recent title opinion or certificate been obtained?

- No
 Yes (attach a copy of the title opinion or certificate)

B.7.11 Statement: Attach a signed statement from the seller(s) that he/she is a willing seller and has not been coerced into selling or conveying the property interest.

B.7.12 Legal Description & Parcel ID: Attached is the legal description of the property and the parcel identification number.

B.7.12.1 Land Description: Provide a description of the land to be purchased.

B.7.12.2 Federal Interest in Real Property: Are you aware that “Federal Interest” refers to real property that is acquired or improved, in whole or in part, with RESTORE Act Direct Component Funds, which must be held in trust by the recipient for the benefit of the project for the Estimated Useful Life of the Project, during which period Treasury retains an undivided equitable reversionary interest in the real property (i.e. the “federal interest”) To document the federal interest, a “Covenant of Purpose, Use and Ownership” (Covenant) will be prepared and recorded against the real property for which the funding was awarded.

No Yes

B.7.12.3 Use of Real Property with Federal Interest: Are you aware that the property on which there is a federal interest may not be used for purposes other than the authorized purpose for which funding was awarded without prior written approval from Treasury. The property must not be sold, conveyed, transferred, assigned, mortgaged, or in any manner encumbered except as expressly authorized in writing by Treasury.

No Yes

B.7.12.4 Insurance: Are you aware that the recipient of Restore funds, must at a minimum, provide the equivalent insurance coverage for real property improved with federal funds as required by 2 CFR 200.310.

B.8 Construction Activities

B.8.1 Permits: Does the proposed activity require any federal, tribal, state, or local permits?

No

Yes (If yes, list the specific federal, tribal, state or local permits required for this project and the status of the permits below)

B.9 Relocation Assistance: Will the proposed project cause the displacement of any persons, businesses, or farm operations?

No

Yes (If yes, as required by Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, explain:

1. the number of displaced persons, including businesses and farm operations;
2. what fair and reasonable relocation payments and advisory services will be provided to any displaced persons;
3. and what provisions will be made to ensure that safe, decent, and sanitary replacement dwellings will be available to such persons within a reasonable period of time prior to displacement.

(End of Part B)

(End of Data Collect Form)

PROJECT RISK ASSESSMENT

Please complete the Direct Component Proposer/Subrecipient Questionnaire which may be found at www.co.okaloosa.fl.us/grants.

The Project Data Collection Form and the Proposer/Subrecipient Questionnaire plus any required supporting documentation must be submitted in order for the project submission to be considered complete.

Project submissions shall be submitted to jevans@co.okaloosa.fl.us.

Attachment A
Project Location



Attachment B
Glenwood Park Summary

SUMMARY OF FINDINGS AND RESTORATION RECOMMENDATIONS

**PREPARED FOR THE
TOWN OF CINCO BAYOU, FL**



GLENWOOD PARK STREAM RESTORATION SITE VISIT

**JEAN HOOD - MAYOR
NICK CHUBB – COUNCIL MEMBER
JIM BRATTON - COUNCIL MEMBER
DANNY MYERS - COUNCIL MEMBER
CAROL KOCH - COUNCIL MEMBER
PAULA ANDREWS - COUNCIL MEMBER**

PREPARED BY:



PREBLE-RISH INC
CONSULTING ENGINEERS & SURVEYORS

90 Beal Parkway NW, Suite C
Fort Walton Beach, FL 32548

SUMMARY OF FINDINGS

A site visit was conducted on January 21, 2015 to assess the hydrologic and fluvial geomorphic condition of the Glenwood Park Stream. The following list describes the primary impairments observed:

- 1) Stormwater runoff impairments to water quality and streambank stability
- 2) Increased sedimentation and channel deposition
- 3) Depositional formations and streambank instability resulting in a braided channel system
- 4) Dominance of exotic invasive plant species along riparian corridor

Item 1 – Stormwater Runoff Impairments

Waterways and receiving waters near urban and suburban areas are often adversely affected by urban stormwater runoff, resulting in adverse impacts to water quality, water quantity, habitat and biological resources, public health, and the aesthetic appearance of waterways. Pollutants, often associated with urban runoff and harmful to receiving waters, fall into the categories listed below:

- Solids (floatables)
- Oxygen-demanding substances
- Nitrogen and phosphorus
- Pathogens
- Petroleum hydrocarbons
- Metals
- Synthetic organics

Stormwater runoff is a major transporter of floatables including paper, plastic bags, packaging materials, bottles, and cans. The presence of floatables and other debris in receiving waters during and following storm events reduces visual attractiveness of the waters and detracts from their recreational value. Figure 1 shows large amounts of trash deposited along the Glenwood Park Stream floodplain.



Figure 1 Large amounts of trash deposited along the stream channel floodplain

In addition to pollutants and trash, stormwater runoff also transmits bacteria and viruses to waterways, potentially exposing the public and aquatic organisms to harmful pathogens. A study conducted by the Florida Fish and Wildlife Research Institute (2000 to 2006) showed red tide associated with *Karenia brevis* blooms (an indicator of high nutrient loading consistent with urban stormwater runoff) was detected at levels > 1000 cells L^{-1} in 63% of the samples collected in Cinco Bayou. In contrast, samples collected during this same study detected *K. brevis* a mere 5% in Garnier Bayou and 20% throughout the western Choctawhatchee Bay.

Stream channel erosion and channel bank scour provide direct evidence of water quantity impacts caused by urban stormwater runoff. Urban runoff increases directly with the amount of impervious area and the degree of watershed development. As urban areas grow, urban streams are forced to accommodate larger volumes of stormwater runoff that recur on a more frequent basis, often leading to stream channel instability. The change in watershed hydrology associated with urban development also causes channel widening and scour, and the introduction of larger amounts of sediment to urban streams. Visible impacts include eroded and exposed streambanks, fallen trees, sedimentation, and recognizably turbid conditions. Figure 2 depicts a previous attempt at stabilizing an eroding streambank using rock rip-rap and rock gabions at the headwaters of Glenwood Park as well as downstream streambank erosion resulting from increased stormwater flows.



Figure 2 Evidence of streambank erosion

Both water quality and water quantity impacts associated with urban stormwater runoff combine to impact aquatic and riparian habitat in streams. Higher levels of pollutants, increased flow velocities and erosion, alteration of riparian corridors, and sedimentation associated with stormwater runoff negatively impact the integrity of aquatic ecosystems. These impacts include the degradation and loss of aquatic habitat, and reduction in the numbers and diversity of fish and macroinvertebrates.

Item 2 – Increased Sedimentation and Channel Deposition

Stemming from massive streambank erosion as well as being transported within urban stormwater runoff, sediment is often observed deposited in areas where the water slows, causing buildup, destroying benthic habitat, and decreasing the stream capacity for flood waters. Figure 3 shows large side-channel depositional bars indicative of urban stormwater impacts and increased sedimentation.



Figure 3 Large side-channel depositional bars

Item 3 – Depositional Formations and Streambank Instability Resulting in a Braided Channel System

As a result of Items 1 and 2, the downstream portion of the Glenwood Park Stream has transformed into a braided stream system. These systems are considered unstable with non-cohesive streambank material and an abundance of bedload sediment. Braided stream systems result from either excessive upstream head-cuts, or in the case of Glenwood Park, excessive streambank failure and erosion that has generated excess streambound sediment. The increased amount of sediment often forms depositional bars or islands, often forcing the water to multiple channels, and a subsequent loss of hydraulic energy and further sediment aggradation.

Item 4 - Dominance of Exotic Invasive Plant Species along Riparian Corridor

Chinese privet (*Ligustrum sinense*) along with Popcorn tree (*Triadica sebifera*), two common exotic invasive plant species in the southeast United States, were observed growing rampantly along the riparian corridor and floodplain of Glenwood Park (Figure 4). Exotic invasive plant species can outcompete and displace native plants that provide food and cover for native wildlife and reduce tree health and longevity among established species. Once dominant, the negative impacts for established trees from exotic invasive plant species along riparian corridors often exacerbates streambank erosion, as many of these native trees and their root systems die, significantly reducing the cover and protection necessary to prevent streambank erosion.

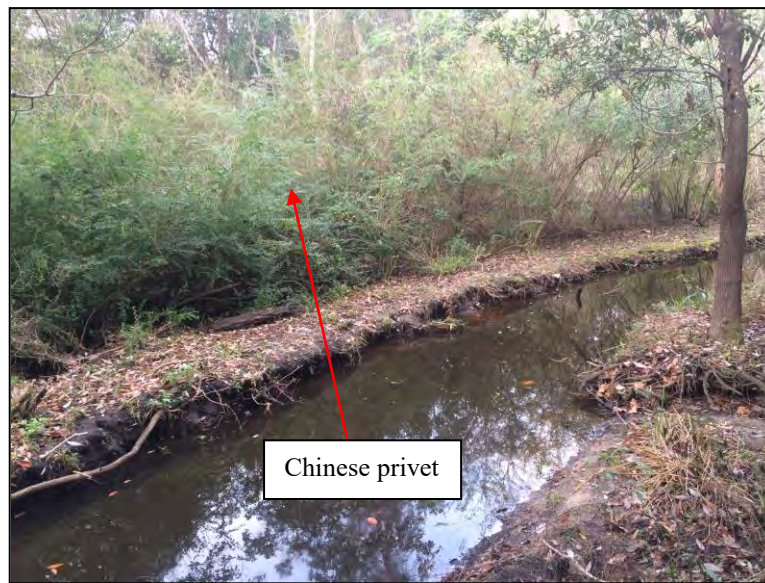


Figure 4 Dense monocultural thicket of Chinese privet

RESTORATION RECOMMENDATIONS

The primary source of channel instability and observed impairments for the Glenwood Park Stream are a direct result of negative urban stormwater runoff practices. Addressing the quantity and quality of stormwater runoff should be at the forefront of the restoration process.

Restoration of the Glenwood Park Stream is recommended for the approximately 1,000 linear foot reach to Yacht Club Drive applying the principles of Natural Channel Design. A restoration project following the Natural Channel Design method consists of restoring a stream to a stable dimension, pattern, and profile that mimics the natural condition. For the Glenwood Park Stream, this might include re-establishing a single thread channel from the existing braided system, installing woody material to control the channel grade as well as protect and armor streambanks from erosion, and removing all non-native plant species (Chinese privet and popcorn tree) and re-planting with native vegetation along the riparian corridor and associated floodplain.