Sub-award Number:	NALCC 2012-06 AMND #1
Grantee DUNS Number:	
Funding Agency:	USFWS
Program Source:	F11AC00223 MOD #3 NALCC 1420
CFDA Program Number:	15.664

NORTH ATLANTIC LCC

GRANT 2012-06 AMENDMENT #1

This Grant Agreement Amendment #1 (this "Amendment") is hereby made as of this 14th day of January 2015 by and between the **WILDLIFE MANAGEMENT INSTITUTE, INCORPORATED ("WMI")**, a New York not-for-profit corporation with a place of business located at 4426 VT Route 215 N, Cabot, VT 05647; and **DOWNSTREAM STRATEGIES, LLC** with an address at 295 High Street, Suite 3, Morgantown, WV 26505 **(Grantee).**

For good and valuable consideration, the receipt of which is hereby acknowledged, the parties agree as follows:

1. **PURPOSE OF THE GRANT:** The Department of the Interior and the U.S. Fish and Wildlife Service (the "Service") are developing a coordinated network of landscape conservation cooperatives (each an "LCC") to provide the science necessary to undertake strategic conservation efforts across large geographic areas, in part to address major environmental and human-related factors that limit fish and wildlife populations at the broadest of scales. In consideration of this, the grant funds are provided to support **"Development of Spatially-explicit Models and Decision Support Tools for Assessing and Prioritizing Conservation Actions for Aquatic Habitats of the North Atlantic LCC"** (the "Project") in the North Atlantic LCC.
2. **PURPOSE OF THE AMENDMENT:** Amendment #1 extends the period of performance with a no-cost extension to June 30 2015. The amendment also revises the budget and modifies the original scope of work to reflect experience gained since grant inception.
3. **SCHEDULE A: PROJECT NARRATIVE:** Revised Schedule A attached.
4. **GRANT BUDGET:** Revised Schedule B attached.
5. **GRANT TERM:** The term of this Agreement shall commence on **February 1 2013** (the "Effective Date"), and shall terminate on **June 30, 2015.**

[*Remainder of page intentionally left blank; signature page follows.*]

SIGNATURE PAGE: AGREEMENT NO.: 2012-06 AMENDMENT #1

IN WITNESS WHEREOF, the parties have executed this Agreement as of the Effective Date.

DOWNSTREAM STRATEGIES, LLC

By:_____
Name:_____
Title:_____

Approved:

WILDLIFE MANAGEMENT INSTITUTE, INCORPORATED

By:_____
Scot J. Williamson, Vice President

SCHEDULE A: AMENDMENT PROJECT NARRATIVE INTRODUCTION

1.1 Original statement of work summary

Downstream Strategies (DS) and its partners proposed to create and implement a flexible and dynamic aquatic assessment process with the North Atlantic Landscape Conservation Cooperative (NALCC) and its partners. The focus of the original statement of work was to utilize an approach for aquatic modeling that was developed and widely accepted for inland streams in the Midwest. That basic framework was to be modified to accommodate coastal and estuarine environments. The initial statement of work proposed a total of 10-20 models to be built for estuarine and inland regions, with all model results populating a multi-criteria decision support tool (DST). The overall intent of this project was to assemble data and analyze conditions to understand fish distribution, habitat, and threats to aquatic species across the NALCC region, while engaging stakeholders throughout all stages of the project to ensure compatibly of results with the specific goals of the NALCC.

1.2 Modification Justification

Based on discussions with the DS project manager, the NALCC assessment project coordinator, and the assessment advisory group, it was determined a modification to the original scope of work was necessary. While the overall intent of the project will not change, after nearly two years of work it has become apparent that the original scope of work is no longer attainable given the effort necessary and the modified needs of the stakeholders. This modified scope of work will focus on discrete modeling efforts and ensure that frameworks are well-developed and the results are adequate, useful, and accepted by the stakeholders and user-groups.

Specifically, DS will produce the following deliverables (details provided in the following sections):

- **Complete Chesapeake Bay brook trout model climate change scenarios.** Supplementing the existing model with new climate change scenarios.
- **Complete winter flounder case study for Narragansett Bay.** Ongoing effort, the focus for this model is to develop useful products for winter flounder managers, but also to create a framework that could be applied to other coastal or estuarine species. This model is nearly complete.
- **Winter flounder model for Long Island Sound.** Using the framework developed for the Narragansett Bay, DS will apply this approach and develop a Long Island Sound winter flounder model.
- **Develop a diadromous species framework for river herring.** This effort will build from the TNC assessment, which compiled and analyzed river herring data for the Atlantic coast.
- All of the results produced in these efforts will be incorporated into a **web-based decision support tool.**

1.3 Goal and objectives

Our goal is to assemble data and analyze conditions to understand fish distribution, habitat, and threats to aquatic species, while developing frameworks to assess estuarine and diadromous fish species. DS will still reach this goal by implementing, improving, and customizing our assessment methodology specific to NALCC needs. Additionally, DS will leverage our existing datasets and decision support tool to enable NALCC stakeholders to prioritize conservation and management efforts for inland, estuarine, and coastal aquatic species.

Our objectives will continue to function around a stakeholder-driven process to compile, analyze, and model existing data; producing results that will be useful to resource managers and develop model frameworks for estuarine and diadromous species.

2. PROJECT TASKS

2.1 Task 1. Inland model (Chesapeake Bay watershed brook trout model)

The brook trout model is complete. To meet stakeholder needs, DS slowed the model development process and allowed an increased role for stakeholder feedback, which has led to additional related analyses.

DS has already completed the following tasks, which were modifications to the original scope:

- Reexamined predictor variables to ensure all relevant and available data is being utilized for model development.
- Provided additional opportunities for in-depth model review.
- Explore the inclusion of invasive species effects on brook trout distribution.
- Completed brook trout assessment model.

DS will perform the following tasks in order fulfill the modified scope of work:

- Develop future climate change scenarios to evaluate brook trout vulnerability to climate change.
- Produce a report that will document the methodology, data needs requirements, constraints and limitations.
- Integrate results into the decision support tool.
- Explore the inclusion of other brook trout research into the decision support tool.

2.2 Task 2. Narragansett Bay winter flounder model

Winter flounder and the Narragansett Bay were chosen as a case study model because of the relative data richness and availability. Despite the seemingly abundant data, creating strong models for this localized area has proven to be more difficult than the models DS created for inland habitats. Despite the challenges that remain, DS along with the ACFHP and the winter flounder technical review team have made significant progress in developing a useful model for stakeholders.

DS has already completed the following tasks, which were modifications to the original scope of work:

- Revisit predictor variables to ensure all relevant and available data is being utilized for model development.
- Make modifications to response variable data to remove potential sources of bias.
- Provide additional opportunities for in-depth model review.

DS will perform the following tasks in order fulfill the modified scope of work:

- Finalize the Narragansett Bay winter flounder model.
- Continue to work with ACFHP and other stakeholders to ensure that resulting products from this effort will be useful and replicable.
- Produce a report that will document the methodology, data needs requirements, constraints, and limitations.
- Integrate results into the decision support tool.

2.3 Task 3: Long Island Sound winter flounder model

DS acquired data collected by ACFHP from multiple entities for Long Island Sound. Data coverage since 2000 is good and the majority of the data is from trawl surveys. DS will develop a model to predict winter flounder relative abundance (or relative abundance of YOY/juvenile winter flounder), where predictor data is readily available. **Due to time and budget constraints, review and stakeholder participation will need to be strictly limited. Critical decisions that are outside of the capabilities of DS will need to be quickly addressed by the core coordinators for winter flounder (i.e. Julie Devers, Lisa Havel, Caroly Shumway).**

Specifically, DS will perform the following tasks:

- Develop a winter flounder model for the Long Island Sound based on existing data sources, with efficient support help from ACFHP technical team.

- Develop report summarizing results, methodology, data needs requirements, constraints, and limitations.
- Integrate results into the decision support tool.

2.4 Task 4. Diadromous species case study

After examining fish sample data compiled from multiple sources, DS will attempt to utilize the run count information from the TNC and Dauwalter reports to create a statistical characterization or prediction of the distribution and/or threats to river herring. At the present time, the exact methodology, project outputs, and likely success of this pilot project cannot be determined, but DS will work with stakeholders to exhaust all options in utilizing the run count data to produce a reliable and useful product for restoration managers. Ideally, DS will be able to create a model that predicts run strength based on habitat variables. This run strength model will allow managers to assess likely habitats outside the current distribution. This model will focus potential restoration efforts to sites that allow access to areas currently unreachable by river herring. If successful, this model MAY also point to additional stressors (such as imperviousness for instance) that are depressing current run strength.

As an alternative, if DS finds the run count data to be insufficient, the creation of a surrogate species model has potential to inform restoration decisions. If an inland species or group of species that inhabit preferred spawning habitat for river herring can be modeled, there is potential to use those predictions in concert with existing efforts to map known and historical locations of river.

If neither of the above options produce usable results, DS can incorporate the results from the TNC river herring restoration project into the final decision support tool. Currently, the TNC report is available in paper form, but has not yet been transferred into a web mapping environment.

Specifically, DS will perform the following tasks:

- Examine the possibility of creating a prediction of distribution and/or threats from the run-count data.
- Examine alternative modeling approaches that could be useful to stakeholders.
- Develop report summarizing results, methodology, data needs requirements, constraints, and limitations.
- Integrate results—of this modeling effort and/or TNC results— into the decision support tool.

2.5 Task 5. Decision support tool

The DS project team will utilize the model results—for the model output listed above— to populate a multi-criteria decision support tool (DST), which will integrate the components of each habitat assessment. The DST will provide a highly functional and user-friendly mechanism for resource managers to visualize, rank, and manipulate inputs to prioritize areas for conservation action. Since the original statement of work, funding for a web-based decision support tool has become available. DS will incorporate NALCC model results into the web-based tool, which will negate the need for a desktop tool.

The DST is a web-based mapping tool that provides three key functions: visualization, ranking support, and futuring:

- **Visualization:** The visualization tool allows easy and intuitive exploration of all data compiled or created during modeling. This tool can be customized to zoom to and display results at varying spatial scales of interest to the NALCC.

- **Ranking support:** This tool ranks catchments within a selected HUC8 watershed (or other relevant region) based on user-defined criteria and weighting of catchment-level variables. These variables will include modeling results and predictor variables, and could also include additional socioeconomic or other variables of interest.

- **Futuring**[1]: The futuring tool predicts changes in the stress index for a selected catchment based on the user modifying existing stressor conditions. Additionally, changes in stressor indices within the

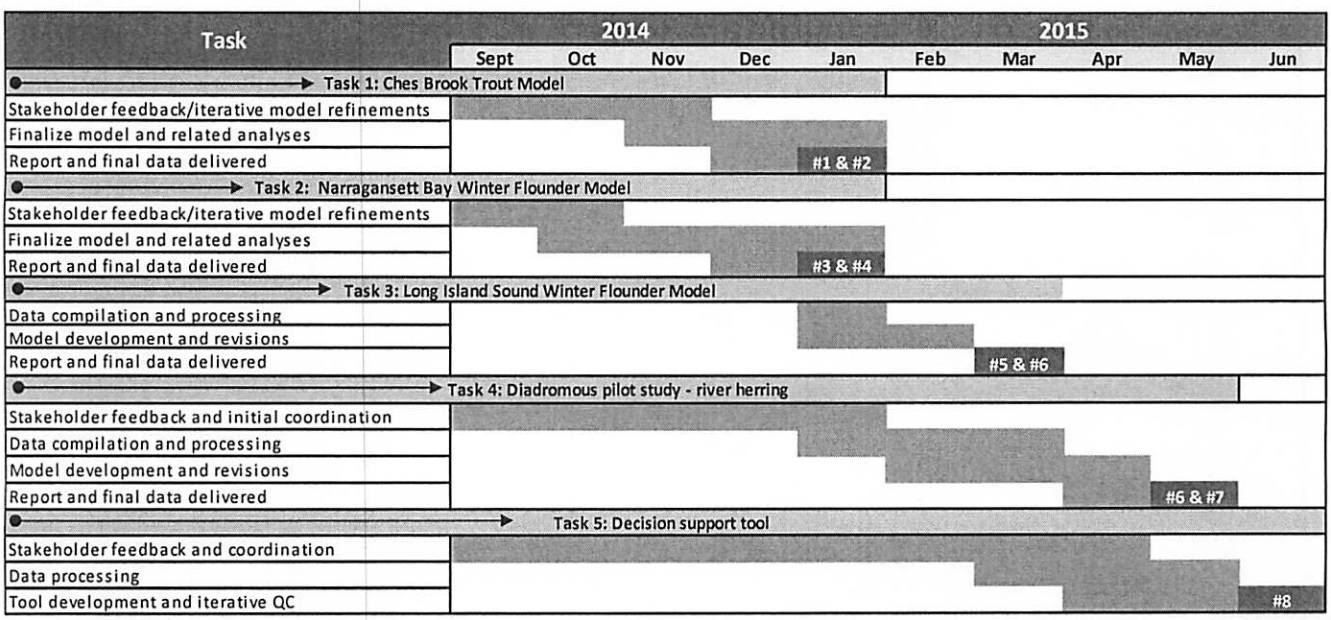
[1] Futuring functionality will only be available for inland species, in this case, the Brook Trout model.

selected catchment can then be propagated downstream with new stressor indices calculated for all downstream catchments.

As described above, the web tool has been designed for inland model results based on NHD+ framework. Similar tools will be developed when and where possible for non-inland models based on feedback from stakeholders and project budget.

3. TIMELINE

The original timeline for this project was two years and was scheduled to be completed by the end of 2014. Because of the issues outlined above, we present this new timeline to finish the remainder of the project tasks. The timeline below links to the following table which identifies key deliverables.



Deliverables	
Deliverable #1	Brook trout model technical report
Deliverable #2	Geodatabase of all data and brook trout model results
Deliverable #3	Nar. Bay winter flounder model technical report/estuarine framework
Deliverable #4	Geodatabase of all data and winter flounder model results
Deliverable #5	Long Island Sound winter flounder model technical report/estuarine
Deliverable #6	Geodatabase of all data and winter flounder model results
Deliverable #7	River herring technical report/diadromous framework document
Deliverable #8	Geodatabase of all data and river herring model results
Deliverable #9	Web-based decision support tool

SCHEDULE B: BUDGET

The original budget for this project was $250,000, there are approximately $87,335 of project funds remaining, allocated and summarized in Table 1. Based on the revised statement of work, the new categorized budget for the remainder of the project is presented below in

Expense Category	LCC Funds	Total Budget
Personnel service	$180,917.00	$180,917.00
Travel	$2,222	$2,222
Supplies	$0	$0
Contractual	$56,585	$56,585
Other	$0	$0
Total Direct	$239,724	$239,724
Indirect	$9,881	$9,881

. Table 3 shows how the remaining budget will be allocated to the remaining tasks, rather than by work category.

Table 1: Original and revised budget as 1/01/2015

Expense	Original	Spent	Remaining	Revised Remaining Budget
DS Labor	$149,395	$143,607	$5,788	$37,310
WVU	$20,000	$13,085	$6,915	$3,500
Critigen	$46,000	$0	$46,000	$40,000
Expenses*	$22,045	$2,222	$19,823	$0.00
Overhead	$12,165	$3,356	$8,809	$6,525
Totals Project Costs	**$249,605**	**$162,270**	**$87,335**	**$87,335**

*To accommodate the revised budget, all expenses have been removed, therefore no travel is budgeted for the remainder of the project.

Table 2: Schedule B revised project budget

Expense Category	LCC Funds	Total Budget
Personnel service	$180,917.00	$180,917.00
Travel	$2,222	$2,222
Supplies	$0	$0
Contractual	$56,585	$56,585
Other	$0	$0
Total Direct	$239,724	$239,724
Indirect	$9,881	$9,881

Table 3: Project remaining budget by task

Task	Description	Budget

Task 1 – Inland model	Complete Chesapeake Bay Brook Trout Model related analyses	$2,500
Task 2 – Estuarine case study	Narragansett Bay winter flounder model and framework development	$2,500
Task 3- Long Island sound model	Complete Long Island Sound winter flounder model	$3,900
Task 3 – Diadromous case study	Diadromous framework development and case study	$23,700
Task 4 – Decision support tool	Development of the web-based decision support tool	$48,210
Total		**$80,810**