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# Inyo/Los Angeles Cooperative Effort to Develop Revisions to the Green Book

## Workplan IIA. - Vegetation Monitoring Issues

March 18, 2008 9 Typo

Developed by staff from Inyo County Water Department and
Los Angeles Department of Water and Power

**Problem Statement**

A vegetation monitoring program is necessary to assist the Technical Group in assessing conditions with respect to the goals of the Inyo/LA Long Term Water Agreement (LTWA). The LTWA states (Section III.A.):

> *The overall goal of managing the water resources within Inyo County is to avoid certain described decreases and changes in vegetation and to cause no significant effect on the environment which cannot be acceptably mitigated while providing a reliable supply of water for export to Los Angeles and for use in Inyo County.*

The LTWA further states (Section IV.A.):

> *The goal is to manage groundwater pumping and surface water management practices so as to avoid causing significant decreases in live vegetation cover, and to avoid causing a significant amount of vegetation comprising either the Type B, C, or D classification to change to vegetation in a classification type which precedes it alphabetically (for example, Type D changing to either Type C, B, or A vegetation).*

On LADWP-owned land that is supplied with water (Type E lands), the LTWA states: "these lands will be supplied with water and will be managed to avoid causing significant decreases and changes in vegetation from vegetation conditions which existed on such lands during the 1981-82 runoff year" (LTWA, Section IV.A).

The LTWA acknowledges that vegetation varies for reasons other than water management by stating in Section II (I.D.):

> *It is recognized that vegetation composition and density varies for reasons other than groundwater pumping, from period to period, depending on weather, precipitation, surface water spreading, and other factors.*

The Green Book states in Section I.B.:

> *One means of achieving the management goals for Owens Valley vegetation is an extensive monitoring program developed with the intent of identifying water management-caused problems before impacts occur.*

The LTWA makes several references to monitoring and monitoring techniques, and assigns the Technical Group responsibility for designing and implementing a monitoring program to determine whether vegetation goals are being achieved. LTWA Section III.E provides that the Green Book is the document containing details of the monitoring program, including site selection, field protocols, and procedures for analysis and interpretation of monitoring results.

Vegetation conditions are the primary indicator to determine whether groundwater and surface water management are in line with the overall goal of the LTWA. The standard by which changes to vegetation are compared is the 1984-1987 documentation of Owens Valley vegetation conditions by LADWP, commonly referred to as baseline conditions or baseline vegetation. As stated in the Green Book (Section I.A., p. 1):

> *...groundwater pumping and changes in surface water management practices will be managed with the goal of avoiding significant decreases and changes in Owens Valley vegetation from conditions documented in 1984 to 1987, and of avoiding other significant environmental impacts.*

When discussing monitoring vegetation response to pumping, the Green Book states in Box I.C.a.ii.:

> *The 1984-87 inventory shall be used as a "baseline" to determine whether vegetation cover and/or species composition has changed.*

The 1984-1987 LADWP inventory of vegetation conditions provides extensive quantitative and qualitative data to assess decreases and changes and thereby determine whether the LTWA goals for water management for non-irrigated vegetation are being achieved.

The Technical Group is charged to monitor vegetation, groundwater conditions, and changes in surface water management in order to ensure the goals and principles of the LTWA are being met. To this end, large amounts of vegetation data are collected annually. These efforts include thirty-two monitoring transects and annual vegetation monitoring program inventories of between seventy and 110 vegetation parcels. Rare plants and riparian vegetation are also monitored. While these efforts yield information invaluable to the Technical Group, cooperative studies to evaluate data collection methods, how baseline data is summarized, the appropriate use of baseline information, or the best way to define vegetation groups have not been completed.

As part of the Green Book revision process and in order to assist the Technical Group to more effectively ensure the goals of the LTWA are being met, the ICWD and LADWP agree to evaluate vegetation monitoring . The recommendations developed under this vegetation monitoring workplan will be directly used in future Green Book revisions.

**Workplan**

Plans for four individual tasks were prepared by the working group. A fifth task incorporates the recommendations from Workplan III, Goal Attainment. A synopsis of the plans is provided below followed by more detailed task plans. It is anticipated that one or more working groups will be assembled to work on individual tasks. Task leaders will be responsible for implementation of delineated Task Plans. Tasks may be modified as investigations move forward if additional questions or issues arise. The schedule may be revised by the project managers to accommodate staff participation on these and other working groups.

Synopsis of the workplan tasks:

- Task IIA-1. An evaluation of the current methods of vegetation data collection and recommended improvements to data collection methodologies.
- Task IIA-2. An evaluation of the baseline vegetation data and a recommendation of whether it is possible to summarize it in a more useful manner.
- Task IIA-3. An evaluation of the quality of the existing baseline data with a recommendation as to the appropriate use of the baseline data.
- Task IIA-4. An evaluation of the baseline vegetation groups with a recommendation if these groups should be redefined.
- Task IIA-5. Incorporate the final recommendations of Tasks IIA-1 through IIA-4 and Workplan IIIA, B, and C into a document to be presented to Standing Committee for consideration for Green Book revision.

**Deliverables**

The deliverables from this workplan will be a document (or documents) that describes ways to improve the collection of vegetation data that will help achieve the goals of the Water Agreement, describe ways that the baseline data could be summarized so that it would be more useful, describe appropriate uses of the baseline data, and an evaluation of baseline vegetation groups. The work group will produce a document in a format that can be easily incorporated into the final revised Green Book.

**Anticipated Resources**

Staff time. It is anticipated that the services of the MWH Owens Valley project team will be required. Peer review services may be required. Depending on methods adopted, expertise may need to be retained in specific monitoring disciplines.

**Schedule**
Workplan to be completed by June 2012

**Personnel**
The workplan leaders are Paula Hubbard and Dave Martin for LADWP and Aaron Steinwand for Inyo County. Other staff will be assigned as necessary. It is anticipated that the services of the MWH Owens Valley project team will be required.

**Budget**
Initially, this task will involve staff time and no Cooperative Study costs are anticipated. Budgets will be prepared for scopes of work identified as work progresses. Cooperative Study funding will likely be utilized for outside facilitator and peer review services if required.

**Task IIA.1. An evaluation of the current methods of vegetation data collection and recommended improvements to data collection methodologies.**

**Problem Statement**
Monitoring is the means to determine the current condition of the environment in order to determine whether management of groundwater and surface water are achieving the overall goal of the LTWA. A scientifically based vegetation monitoring program is essential to determining how much vegetation change is taking place and what these changes are.

**Description**
Sections II and III of the Green Book detail the methods to be used for monitoring vegetation within the Owens Valley. The work group will assemble and summarize the current vegetation monitoring data and methodologies of each agency including maps of the monitoring locations. The purpose of this step is to develop a common data set, understand what methods have been used, and the extent and quality of existing data. Once that review is complete, the working group will examine potential improvements that can be made to the vegetation monitoring.

**Method**
Initially, the working group will exchange reports and evaluations of the current monitoring program conducted by each agency, goals of the LTWA, and develop a mutual understanding of the goals for a revised vegetation monitoring program.

The working group will examine all of the vegetation data and methods for its collection and evaluate strengths and limitations of these data. Once the evaluation is complete, the working group will recommend improvements that could be made to vegetation monitoring that will ensure that the goals of the LTWA can be achieved.

**Deliverables**
The deliverables for this task will be a technical memorandum that includes an evaluation of the strengths and limitations of the current methods of vegetation data collection and recommended improvements that can be made to data collection methodologies.

**Anticipated Resources**
No special tools or equipment will be required to complete this task.

**Schedule**
This work is expected to take approximately nine (9) months, assuming adequate resources are available. In consideration of the importance of this work, it should begin immediately. The initiation of this work is not dependent on data developed in previous tasks, but the results should feed into Task IA-3.

**Personnel**
The task leaders are David Martin for LADWP and Aaron Steinwand for Inyo County Water Department. Other staff may be assigned as necessary. It is anticipated that the services of the MWH Owens Valley project team will be required.

**Task IIA.2. An evaluation of baseline vegetation data and recommendation of whether it is possible to summarize it in a more useful manner.**

**Problem Statement**
The standard by which changes to vegetation are evaluated is the cover and composition of the vegetation as sampled in 1984-1987, and commonly referred to as baseline conditions. These baseline values are critical to establishing management goals and in addressing questions of possible impacts.

The baseline mapping effort utilized a technique that employed air photo analysis, field checking, and sampling transects to document the dominant vegetation cover. Generally, vegetation inventories were used to document conditions over large land areas, providing a baseline for comparison to future vegetation cover. It was assumed that by regularly performing such a comparison, Inyo County and Los Angeles could monitor the effectiveness of the proposed hydrologic management techniques and make appropriate adjustments to meet the goals of the LTWA.

**Description**
This task is to evaluate existing baseline data and summaries of these data. Once the evaluation is complete, the working group will determine if data has been summarized adequately or if data can be summarized more usefully to aid in revising the Green Book.

**Method**
The working group will examine all of the baseline vegetation data and methods for its collection and evaluate the quality of these data. Once the evaluation is complete, the working group will examine potential uses of these data and evaluate the appropriateness of these uses considering the quality of the data. Once the evaluation is complete, the

working group will recommend improvements that could be made to summaries to make them more useful in ensuring that the goals of the LTWA can be achieved.

**Deliverables**
The deliverables for this task will be a technical memorandum that includes an evaluation of the baseline vegetation data and recommend whether it is possible to summarize it into a more useful manner.

**Anticipated Resources**
No special tools or equipment will be required to complete this task.

**Schedule**
This work is expected to take approximately nine (9) months, assuming adequate resources are available. In consideration of the importance of this work, it should begin immediately. The initiation of this work is not dependent on data developed in previous tasks, but the results should feed into Task IA-3.

**Personnel**
The task leaders are Paula Hubbard for LADWP and Aaron Steinwand for Inyo County Water Department. Other staff may be assigned as necessary. It is anticipated that the services of the MWH Owens Valley project team will be required.

**Task IIA-3. An evaluation of the quality of the existing baseline data with a recommendation as to the appropriate use of the baseline data.**

**Problem Statement**
The standard by which changes to vegetation are to be measured is the cover of the vegetation as sampled in the 1984-1987 inventory, and commonly referred to as baseline conditions or baseline vegetation. These baseline values are critical to establishing current management goals and in addressing questions of possible impacts. However, a joint evaluation of the quality of these data has never been conducted. Further, the appropriate use of these data has never been evaluated.

**Description**
During the 1984-87 inventory, most parcels were sampled with at least five line-point transects of 100 feet in length, with sampling points at one-foot intervals, providing a two-dimensional representation of vegetation within the parcel. At each one-foot marker, the first contact with the uppermost layer of live plant cover was recorded. Cover and species composition were then calculated. The Green Book described the 1984-87 inventory as a "baseline" for comparative purposes to determine whether vegetation cover and/or species composition has changed. The appropriateness of this methodology has never been evaluated.

**Method**
The working group will examine all of the baseline vegetation data and methods for its collection and evaluate the quality of these data. Once the evaluation is complete, the

working group will examine potential uses of these data and evaluate the appropriate methods to compare with monitoring results considering the quality of the data.

**Deliverables**
The deliverables for this task will be a technical memorandum that includes an evaluation of the quality and appropriate use of the baseline information.

**Anticipated Resources**
No special tools or equipment will be required to complete this task.

**Schedule**
This work is expected to take approximately nine (9) months, assuming adequate resources are available. In consideration of the importance of this work, it should begin immediately. The initiation of this work is not dependent on data developed in previous tasks, but the results should feed back into Task IA-3.

**Personnel**
The task leaders are David Martin for LADWP and Aaron Steinwand for Inyo County Water Department. Other staff may be assigned as necessary. It is anticipated that the services of the MWH Owens Valley project team will be required.

**Task IIA-4. An evaluation of the baseline vegetation groups with a recommendation if these groups should be redefined.**

**Problem Statement**
For management purposes, the LTWA divides the vegetation of the Owens Valley floor into five management types classified as A, B, C, D, and E. Vegetation was assigned to Types A through E by calculating the average evapotranspiration of each community or based on land use.

The Green Book recognized that through ongoing monitoring, studies, or analysis, that vegetation that may have been incorrectly classified could be identified and reclassified as appropriate. Subsequent analyses by Inyo County called the calculations into question and made recommendations for possible improvements to the classification.

**Description**
After the completion of the data collection for baseline conditions, the data was categorized by vegetation community. The water requirements for all the parcels that fell into specific vegetation communities were averaged. This average value was then compared to quad specific average precipitation to determine if the community's average water requirements exceeded water supplied by precipitation alone. Using this data, communities were placed into one of the five management types.

**Method**
The working group will examine all of the vegetation data and the associated management types and evaluate any limitations of these data or groupings. Once the

evaluation is complete, the working group will recommend improvements that could be made to the management types and vegetation monitoring efforts that will ensure that the goals of the LTWA can be achieved.

**Deliverables**
The deliverables for this task will be a technical memorandum that includes an evaluation of the baseline vegetation groups and a recommendation of whether it is reasonable to redefine these data into groups that are more useful.

**Anticipated Resources**
No special tools or equipment will be required to complete this task. It is anticipated that the use of an outside facilitator will be required.

**Schedule**
This work is expected to take approximately nine (9) months, assuming adequate resources are available. The initiation of this work is not dependent on data developed in previous tasks, but the results could feed back into Task IA-3.

**Personnel**
The task leaders are David Martin for LADWP and Aaron Steinwand for Inyo County Water Department. Other staff may be assigned as necessary. It is anticipated that the services of the MWH Owens Valley project team will be required.

**Task IIA-5. Incorporate the final recommendations of Tasks IIA-1 through IIA-4 and Workplans IIIA, B, and C into document to be presented to Standing Committee for consideration for Green Book revision.**

**Problem Statement**
The vegetation monitoring program as conducted under the Green Book may be better designed to strengthen the ability to fulfill the goals of the Long Term Water Agreement

**Description**
The collection and management of vegetation data may be reorganized or refined to be more useful in meeting the goals and requirements of the Long Term Water Agreement.

**Method**
The working group will integrate the information and final recommendations derived from Tasks IIA-1 through IIA-4 and Workplans IIIA, B, and C into a document or documents intended to be submitted to the Standing Committee for approval for insertion into the Green Book.

**Deliverables**
The deliverables for this task will be a technical memorandum that includes specific proposed revisions to the Green Book for vegetation data collection and management.

**Anticipated Resources**
No special tools or equipment will be required to complete this task.

**Schedule**
This work is expected to take approximately nine (9) months, assuming adequate resources are available. The initiation of this work is dependent on completion of Tasks IIA-1 through IIA-4 and Workplans IIIA, B, and C.

**Personnel**
The task leaders are David Martin for LADWP and Aaron Steinwand for Inyo County Water Department. Other staff may be assigned as necessary. It is anticipated that the services of the MWH Owens Valley project team will be required.

Approval for Release:

Aaron Steinwand / Date 3-25-09
Project Manager, ICWD

Robert Prendergast 3-19-09
Robert Prendergast / Date
Project Manager, LADWP