

Strategic Planning in Dam Safety

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Introduction

Dams are an often overlooked piece of critical infrastructure and many of them are in a critical state. Dams provide electrical power, flood mitigation and control, drinking water reservoirs, recreation areas, and navigable waterways. Infrastructure in general is something that loses funding first in the face of budget cuts. Out of sight out of mind until a major dam failure happens and results in loss of life and major property damage. Several spectacular dam failures in the 1970s led to a national program to improve dam safety. To illustrate the scale of this problem, there are 84,000 dams in the U.S., 27,000 of whose failure could lead to a loss of life or property damage. 14,000 of these are classified as high hazard which means a failure would probably lead to loss of life. In 2009, more than half of these dams did not have an emergency action plan in place (NDSP, 2012, p. 4).

The Federal Emergency Management Agency (FEMA) was tasked by congressional legislation in 2006 with being the leader in strategic planning for dam safety. The Dam Safety Act of 2006 outlined seven objectives, of which the FEMA is to address with its strategic plan. FEMA was directed to lead this program which is comprised of other federal and state agencies.

The Association of State Dam Safety Officials (ASDSO) has also created a strategic plan, which is reviewed and updated every five years. The ASDSO is an organization that operates within the framework of the NDSP and in support of it (ASDSO, 2012, p. 4). This is an organization comprised of state and federal dam safety officials, engineers, scientist, dam operators, and academics among others. It is comprised of a broad range of interested parties bringing their own unique skillsets and outlooks. The organization seeks to promote dam safety through education and partnerships.

The government of Victoria, Australia has published a Strategic Framework for Dam Safety Regulation. It does not change existing regulations or legislation but implements a way to ensure long term safety and improvements of dams. According to the introduction, Victoria has 455,000 dams, most of which are very small and not applicable to this plan. This plan seeks to regulate larger dams or those that pose higher level of damage in the event of a failure.

Strategic Plan for the National Dam Safety Program (NDSP) 2012-2016

The NDSP plan is very thorough and comprehensive plan. It is constructed in the same manner as most federal strategic plans. The Executive Summary starts by reflecting on the background leading up to this plan. In 2006, Congress passed the Dam Safety Act and required Federal Emergency Management Agency (FEMA) to be the lead in this strategic planning. The Executive Summary goes on to identify ten federal agencies along with state and private sector representatives that comprise the National Dam Safety Review Board and Interagency Committee on Dam Safety. It then states the NDSP's Vision and Mission statements along with the supporting Goals and Objectives. It also states the new strategic priorities in support of the Goals (NDSP, 2012, p. iii-v).

Chapter 1 is an introduction outlining the purpose of the plan, the challenges involved with this piece of critical infrastructure, and how FEMA anticipates meeting this challenge. It highlights the seven objectives that were part of the Dam Safety Act of 2006, to which this plan is a direct response on how these objectives are being addressed. This section also highlights major dam incidents and failures for 10 years preceding the plan along with the current state of dams and the hazards from these. Finally, it identifies the six main components of the National

Preparedness System, as laid out in Presidential Policy Directive (PPD)-8, that were used when preparing this plan (NDSP, 2012, p. 1-4). Chapter 2 reiterates the Vision, Mission, and Strategic Priorities for this plan (NDSP, 2012, p. 5).

Chapter 3 is the Goals and Objectives of this plan. The plan has five goals and twelve supporting objectives. After the objectives for each goal follows a section of implementation activities and the goal outcome. The goals and objectives are composed of good, supporting information (NDSP, 2012, p. 6-16). Chapter 4 is a conclusion, emphasizing a simple and realistic plan. FEMA planners have tried to construct the plan in an achievable way given budget and time constraints (NDSP, 2012, p. 17).

Evaluation:

In many ways, NDSP is one of the best plans examined this semester. Starting with the Executive Summary, one could take these 3 pages and read them as a standalone document and have a very good idea of what the NDSP is about without needing to read the rest of plan. It is also very useful to put together all topics covered in the plan into a single place so when reading detailed portions further in to the plan, the reader has a reference to understand from where goals, objectives, and other sections were derived.

The goals and objectives chapter were very well done in this plan. The goals are a single short, concise sentence. Each goal has between one and three paragraphs following to explain what the goal is addressing and other relevant who, what, where, and how of this goal. The objectives likewise are typically a concise, descriptive sentence followed by an in depth description. At the end of each goal's section, there is an Implementation Activities with bullet points describing what needs to be done to put the objectives in to action. Finally there is a Goal

Outcome with an end state of this goal, e.g. “Goal 3: Promote public awareness of the benefits and risks related to dams (NDSP, 2012, p. 11)” and “Goal Outcome: Increased public understanding of dam safety issues, benefits, and risks (NDSP, 2012, p. 13).”

When using the Specific, Measurable, Attainable, Rewarding, and Timed (SMART) to evaluate this plan it still falls short of meeting all the requirements. The goals and objectives do a very good job of being specific, attainable, and rewarding. Many are missing measurable quantities and those that do have a measurable outcome still lack a time factor in which this is to be accomplished. Because of the information contained in the plan it should not be difficult to rewrite objectives to meet SMART guidelines. This plan also does not label its objectives as most other plans have done. This plan numbers objectives sequentially one through twelve as opposed to Goal 3, Objective 3 being labeled 3.3.

FEMA and the NDSP publish a Year-in-Review, in this case 2014-2015, which highlights the accomplishments of the program. It is however lacking in many areas. If it is a review of the program, it should be organized to specifically address at least the goals, if not the individual objectives. A report on the program should highlight the ending numbers from the previous report and the changes during the current period being reported on. This report focuses primarily on workshops, training, and outreach performed during this time. It does not bring these figures back to address certain goals and how it is impacting the strategic plan. This is a high level report but should do a better job addressing these.

There is a longer and more in depth document that does address some of these issues. It is the NDSP biannual report to Congress. Comparing the 2000-2001 and the 2014-2015 plan similarities and differences stand out. Both give concrete numbers on inspections completed by

what agency, remediation taken during this time, and other activities undertaken by the NDSP. Both only focus on the past two years' worth of data. It should give ending numbers for the last report so progress can be evaluated. Because of this, one would have to download the previous report and compare the two. Both reports also use case studies of successes as well specific agency break down of efforts. Differences are the change in agencies and their tasks, most likely affected by the Dam Safety Act of 2006 and the creation of the Department of Homeland Defense. Also the new plan does break down progress by goals from the strategic plan (NDSP, 2016, p. 3-18); however, it does state that all goals and objectives from the NDSP strategic plan have been met during this period (NDSP, 2016, p. iv). It is hard to say this for certain without concrete numbers to start with in the plan. It should end with specific numerical goals for the next report to evaluate success or possibly publish a biannual addendum, amendment, or appendix to the Strategic Plan.

Association of State Dam Safety Officials (ASDSO) Strategic Plan 2012-2016

The second section entitled ASDSO and Dam Safety in the U.S. summarizes dams, their positive impact and associated risks. It has a chart of just nine selected dam failures cost more than \$10.5 billion and between 1960 and 1998 dam failures killed 300 people. It is quick to point out the lack of funding and resources to ensure long term dam stability and enable repairs. It is estimated that \$16 billion dollars would be needed to rehabilitate high risk dams in need of repair. It also points out not only the lack of financial resources but also the lack of personnel to inspect dams and enforce code. This section continues to elaborate on the ASDSO's role in promoting dam and levee safety, working within the NDSP framework, as well as the National

Dam Safety Review Board. This section is followed by vision and mission statements (ASDSO, 2011, p. 2-5).

The plan then lists six strategic planning goals followed by descriptions of each goal. The goal descriptions are one or two paragraphs worth of explanations. This section does not however consist of objectives supporting each goal (ASDSO, 2011, p. 5-7). The next section contains a table of each goal and its supporting activities and performance measures. Each goal has groups of supporting activities and each of these groups is supported by measures to be taken to accomplish these activities (ASDSO, 2011, p. 8-15).

Evaluation:

The ASDSO plan another well written and comprehensive plan. It starts by illustrating the hazards posed by inadequate dam safety measure and follows this by explaining the objectives of the organization and the efforts which the organization seeks to support. The goals are a single, simple, and concise sentence that easily conveys the idea to the reader. The descriptions of the goals are also clearly articulated and support the goal. The table layout is different and does provide a clear organization and instant readability. It allows for easy grouping and relationship between goals, activities, and measures.

The ASDSO plan lacks some of the organization and easy readability that the NDSP and other federally composed plan contain. The ASDSO plan follows the same rough outline does not contain separate chapters that are found in the NDSP plan. It could easily be divided in to a couple of separate sections instead of being lumped together. The table could be a separate chapter or appendix to the plan. The table, while easily readable and well organized does take a change in process if the reader is used to reading federal plans. Following the general

acknowledged format for strategic plans would be helpful with using this one in conjunction with other plans. This would be especially helpful since ASDSO seeks to work within the NDSP framework as well.

This plan also falls short when using SMART for evaluating the plan. As with most plans, where this one falls short is in measurability and time. Because of the organization of the table, it would be very easy to add this to the plan. Under measures it lists what is going to be done to accomplish the activities. Adding measurable numbers to these measures should be simple if these are already being tracked by the organization. To simply list “percent increase” is measurable but does the organization consider a 1% increase as success or does it seek a 10% increase. Adding a time to activities should be done to evaluate the success of the measures being undertaken.

This plan is much more substantial than the ASDSO’s previous strategic plan from 2007. This plan contained an interdictory paragraph, vision statement, mission statement, goals and objectives. This plan barely required eleven pages, with little to no explanation of objectives other than single sentences of action steps. It is one of the poorest examples of a strategic plan examined so far (ASDSO, 2007, p. 1-11).

Strategic Framework for Dam Safety Regulation (SFDSR) 2012

The SFDSR from the state of Victoria in Australia differs quite a bit from the two other plans from the U.S. It begins with an interdictory section giving purpose, background and history of dams in Victoria followed with the objectives and principles of this framework. Chapter 3 establishes the regulatory background for the program under the Department of

Sustainability and Environment (DSE) as well as explaining current licensing and current regulations of different types of dams. It also compares the states regulatory approach when compared with other Australian states (DSE, 2012, p. 4-7).

Chapter 4 elaborates on Victoria's approach to regulating dams within the state. First, by establishing risk management practices and continuing with other key processes in the regulation of dams (DSE, 2012, p. 8-21). Chapter 5 focuses on extra regulations specifically targeting high risk dams. These are dams are which a failure could cause a catastrophic loss of life. It works with the dam's responsible parties to maintain key criteria for dam safety and tries to assure funding to make sure needed repairs are performed. (DSE, 2012, p.22-25).

Evaluation:

Using the NDSP as a basis for evaluating the SFDSR is difficult because the plan does not use the typical formatting found in U.S. plans; however, with closer scrutiny, parallels can be made. Chapter 1 gives a purpose, background, and history (DSE, 2012, p. 1-2). All of these are found in the other two plans. Chapter 2 is Objectives and Principals. It is not labeled as such but the top of the page contains a vision statement at the top of the page labeled as the objective of the framework. The principles closely resemble the strategic priorities found in the NDSP plan (DSE, 2012, p. 3).

Chapter 4 could be evaluated as the goals and objective of the framework. Initially it focuses on risk management matrices and practices which is not something that is emphasized in the same way in the other two plans. However, all of the subsections of Chapter 4 contain a single sentence statement starting those sections with supporting details. The details contain evaluating performance measures and practices supporting the section (DSE, 2012, p. 8-20).

Using SMART to assess the plan is more difficult in this situation because the plan was not specifically written in the Goal/Objective format. Most time aspects are left out of the plan. Each of the subsections containing goals contain a lot of extraneous information in relation to SMART but at the same time is beneficial to the way this plan is written. Probably a better use for this plan would be to use it to establish goals and objectives. It seems to be intended that individual dams or smaller regulating bodies would establish goals for dam safety within this plan.

Conclusion

These three plans show three separate methods to form a strategic plan for dam safety. The National Dam Safety Program plan is a very thorough and complete plan. It follows the typical government format. The implementation activities and goal outcomes were a good addition in comparison to the typical government plan. The Association of State Dam Safety Officers plan roughly follows the same format but uses a table to format and organize goals, supporting activities, and measures. With the large quantity of activities and measures contained in this table, it is probably better in this format than objectives. It is also easier identify what measures apply to what activities than listing implementation activities at the end of each goal section like the NDSP plan. This enables more specificity for each measure. The Strategic Framework for Dam Safety Regulation from Australia was a challenge to compare to the two U.S. because it doesn't use the same type of formatting and is not written to address the same issues the U.S. plans do.

One major deficiency of all the plans a lack of measurability and a time within the goal or objective would be measured. Without adding these two factors it can be very difficult to evaluate the efficacy of the plan. It could be assumed that all of this would take place within the four or five year timelines of each plan but some could be long term and some could be short term goals. It also make it easy to evaluate a plan and say everything is working as planned. If an objective is to increase phone calls about dam leakage and this goes up by one phone call the objective has been met but can it truly be called effective. Because these are large bureaucracies fighting annually for funding this might be part of the point. The agency is able to show money is being spent effectively and goals are being met whether the expenditures are truly worthwhile or not.

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