6 Goals

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- 6.3.6 Roadway safety and early warning systems
- 6.3.7 Infrastructure assessment, maintenance, and rehabilitation
- 6.3.8 Nature-based solutions, green infrastructure, and preservation
- 6.3.9 Funding
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6.4 Residual risk

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Quick facts

A total of 350 flood planning goals were adopted across all 15 regional flood planning groups.

Of those, 187 were short term (by 2033) and 163 were long term (by 2053).

The overarching goals of Texas' state and regional flood planning process as set forth in Texas Water Code § 16.061 are:

- to provide for the orderly preparation for and response to flood conditions;
- to protect against the loss of life and property;
- to be a guide to state and local flood control policy; and
- to contribute to water development where possible, all without making flooding conditions worse for neighboring areas.

The regional and state planning administrative rules provide a common framework and technical guidance for each regional flood planning group to develop common goals while considering a variety of local interests and the entities that regulate floodplain development and will implement the projects. Ideally, the development of common, shared regional flood planning goals will improve basin-wide floodplain and flood risk management.

6.1 Regional flood planning goal requirements

Identifying and setting goals is an important step in any planning process and helps ensure that plans are developed and implemented to work towards specific and achievable results. Goals demonstrate commitment to the success of the greater regional and state flood planning process. The statewide flood plan is a cyclical effort recurring every five years, during which the regional planning groups will review the goals they set for their region during preceding cycles and consider how much of each goal was achieved. Along the way, the planning groups may also modify, add, or remove goals.

The regional flood planning groups are self-governing entities with considerable latitude in setting goals for their respective regions. The administrative rules in 31Texas Administrative Code § 361.36,[34] Flood Mitigation and Floodplain Management Goals, specify the required structure and presentation of goals and the regional flood plan components that must be considered when identifying these goals. Additional considerations are listed in the state and regional flood planning guidance principles under 31 Texas Administrative Code § 362.3. The guidance principles include several references to goals, including specific requirements that state and regional flood plans

- include flood management strategies and projects recommended by the regional flood planning groups that are based upon identification, analysis, and comparison of all flood management strategies the regional flood planning groups determine to be potentially feasible to meet flood mitigation and floodplain management goals; and
- consider land use and floodplain management policies and approaches that support short- and long-term flood mitigation and floodplain management goals.

The regional flood planning groups were required to define specific and achievable flood mitigation and floodplain management goals for their regional flood plans that, when implemented, would demonstrate progress towards the overarching objective "to protect against the loss of life and property," as set forth in the flood planning guidance principles. The regional flood planning groups were asked to consider the unique weather related and geographic characteristics of their respective flood planning

[34] https://texreg.sos.state.tx.us/public/readtac$ext.ViewTAC?tac_view=5&ti=31&pt=10&ch=361&sch=C&rl=Y

regions, their existing and future condition flood risk, and the existing floodplain management practices across their region, while setting goals.

Regional flood planning groups were required to establish goals considering short-term (within 10 years by 2033) and long-term (within 30 years by 2053) planning horizons. Setting short- and long-term goals helps to outline a progressively successful path forward in meeting identified flood risk needs.

As goals are generally broad statements, the regional flood planning groups were asked to limit the geographical scope of the goals to a single subbasin level (a map boundary that is defined by the U.S. Geological Survey as a medium-sized river basin coded with the term Hydrologic Unit Code, or HUC, 8) (USGS, n.d.).

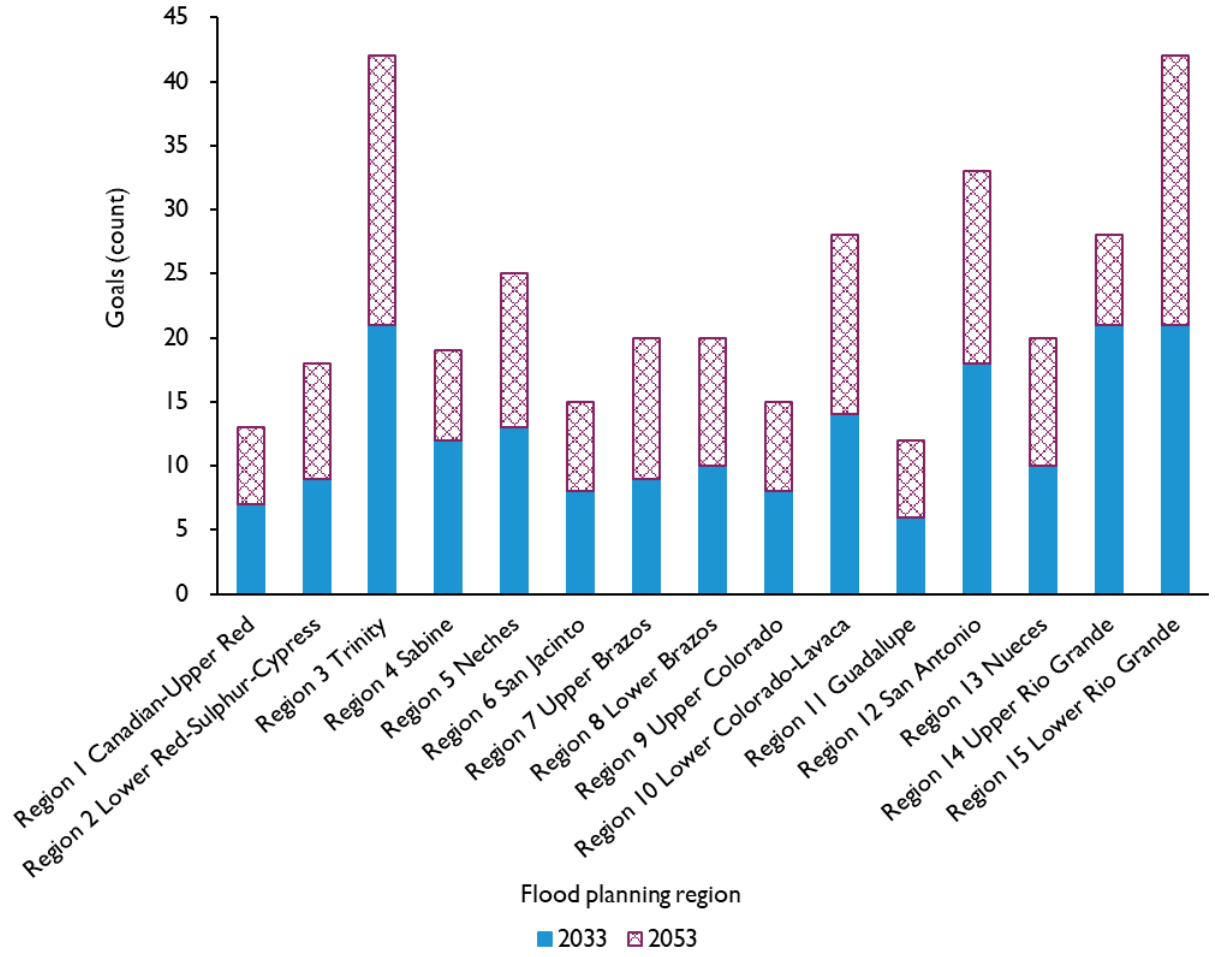
In addition to administrative rules, each regional flood planning group approached the process of defining its region-specific goals using detailed technical guidelines provided by the Texas Water Development Board (TWDB), which provided flexibility to consider unique regional characteristics and flood risk information developed in previous tasks. Examples of unique regional characteristics include geographic features, such as playas in the Panhandle region, high percentages of rural or urban communities, or steep elevation changes that could lead to flash flooding.

The regional flood planning groups devoted time during public meetings over several months for deliberations on appropriate flood mitigation and floodplain management goals for their respective areas. Each regional flood planning group gathered input regarding the selection of goals using different formats, ranging from public input meetings to online questionnaires and surveys that gathered responses and categorized priorities. Most planning groups discussed goals four to five times during the plan development and generally followed a similar pattern of goal development: 1) introduction to goals, 2) categorization of goals, 3) prioritization of recommended goals, and 4) adoption of goals.

6.2 Summary of regional flood planning goals

The 15 planning groups identified and adopted a total of 350 goals reflecting the unique conditions and needs of their regions. Of these, 187 are short-term goals and 163 are long term. Not every short-term goal has an equivalent long-term goal. In some cases, a goal could be achieved in the short term and, therefore, would not require a long-term equivalent or vice versa. For example, if full participation of every municipality in the National Flood Insurance Program was a short-term goal, no long-term goal would be needed once all the municipalities are participating. Figure 6-1 shows a numerical summary of short-term and long-term goals adopted by each region.

Figure 6-1. Count of short- and long-term flood planning goals by flood planning region



The varying geographic size, population, and environmental and hydrologic conditions resulted in a variation in the number of goals per region. Region 15 Lower Rio Grande and Region 3 Trinity have the greatest number of goals (42), while Region 11 Guadalupe identified the fewest (12). The average number of goals per region was 17. The total number of goals per region does not reflect the volume or quality of related work but rather that regions are unique, and each planning group crafted its goals within specific contexts and at varying levels of resolution.

Regional flood planning groups were required to associate their recommended flood management evaluations, projects, and strategies in their regional flood plans with their adopted goals. In concept, the recommendations should all work toward achieving the region's flood mitigation goals.

Regional flood planning groups shaped their goals to be measurable by comparing the current flood risk to what they want to achieve in the future, either using percentages or number counts. For example, one region might aim to reduce the percentage of communities without adequate floodplain standards by 25 percent. Another region might aim to increase the number of counties with digital flood maps by five. Progress toward both goals will be tracked in future iterations of the flood plans.

6.3 Key themes of the planning goals

The TWDB analyzed the collective 350 goals for similarities to determine if any trends or themes could be identified. This analysis involved selecting keywords to attempt to group the collective goals based on the intended result of each goal if implemented. These summary keywords were then collated and given a theme. This exercise was intended to gain an overall sense of what the regional flood planning groups aim to accomplish while recognizing that overlap remains between some of the goals and themes. It would be difficult to assign goals into groups in a meaningful way due to these overlaps.

An example of this overlap can be seen with Region 13 Nueces' goals to 1) identify dedicated funding sources, including state funding opportunities, for 20 percent of the communities and 30 percent of the counties and 2) develop a strategy for public engagement on flood-related issues, including a list of flood mitigation funding programs and potential opportunities for communities to participate in programs to support flood risk reduction (such as the FEMA Community Rating System) to serve as a template for rural and underserved communities by 2030. This goal includes the themes "stakeholder and public outreach," "policy/higher floodplain management," and "funding sources."

The TWDB identified 13 overarching themes from the flood planning goals adopted by the flood planning groups:

1) Conducting flood risk reduction studies
2) Reduce structures and population in the 1 percent (100-year) and 0.2 percent (500-year) annual chance event floodplains
3) Implementing flood risk reduction projects
4) Stakeholder and public outreach, education, and training
5) Higher floodplain management standards/policies
6) Roadway safety and early warning systems
7) Infrastructure assessment, maintenance, and rehabilitation
8) Nature-based solutions, green infrastructure, and preservation
9) Funding
10) Reducing flood risk to critical facilities
11) Water supply
12) Non-structural flood risk reduction
13) Multiple themes[a]

[a] *Approximately 69 percent (242) of all regional flood planning goals belonged to more than one theme.*

6.3.1 Conducting flood risk reduction studies

Approximately 21 percent (74) of all goals seek to reduce flood risk through studies (Figure 6-2). This includes goals for performing studies to analyze unmapped areas, increase flood risk data coverage and availability, and studies to advance flood mitigation project development (Table 6-1).

Figure 6-2. Goals to implement flood risk reduction studies by flood planning region

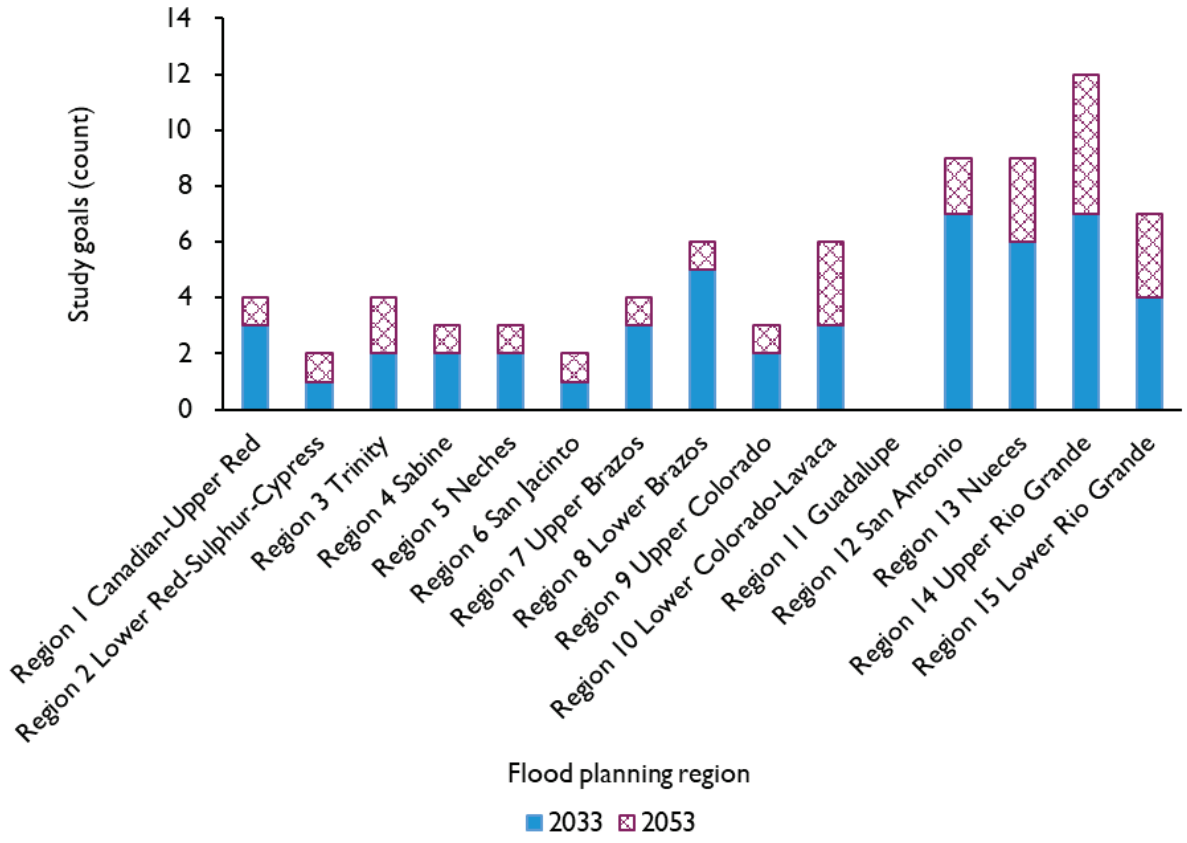


Table 6-1. Examples of goals related to risk reduction studies

Region	Goal	Term of goal	Target year
8	Reduce the gap in the accuracy of flood hazard data in the flood planning region by performing detailed studies using the best available terrain, land use, and precipitation data to reduce gaps in floodplain mapping.	Long term (30 year)	2053
13	Identify structures within existing floodplain with 1 percent annual chance flood risk for 100 percent of the basin, including areas that have been updated with more accurate mapping. Prepare a list of high-hazard buildings based on function, critical function, repetitive loss, or other community-related importance, summarize and distribute results to affected floodplain management entities. Reduce the number of high-hazard structures within the 1 percent existing floodplain by 50 percent.	Long term (30 year)	2053
15	Decrease the average age of FEMA Flood Insurance Rate Maps used to define special flood hazard areas in the region by 30 to 40 percent.	Short term (10 year)	2033

Note: All goals listed here and throughout were adopted by regional flood planning groups

6.3.2 Reduce structures and population in the 1 percent (100-year) and 0.2 percent (500-year) annual chance floodplains

The goals in this theme aim to reduce the number of structures located in flood hazard areas, thereby reducing the population at risk of flooding. Approximately 16 percent (57) of all goals seek to reduce flood risk and exposure in the 1 percent (100-year) and 0.2 percent (500-year) annual chance floodplains (Figure 6-3). This includes goals to remove, relocate, or reduce the number of structures and critical facilities in the floodplain and goals to reduce the risk of flooding to agricultural lands (Table 6-2).

Figure 6-3. Goals related to risk and exposure reduction in the 1 percent (100-year) and 0.2 percent (500-year) annual chance floodplains (including structural improvements, land acquisition, and agricultural land) by flood planning region

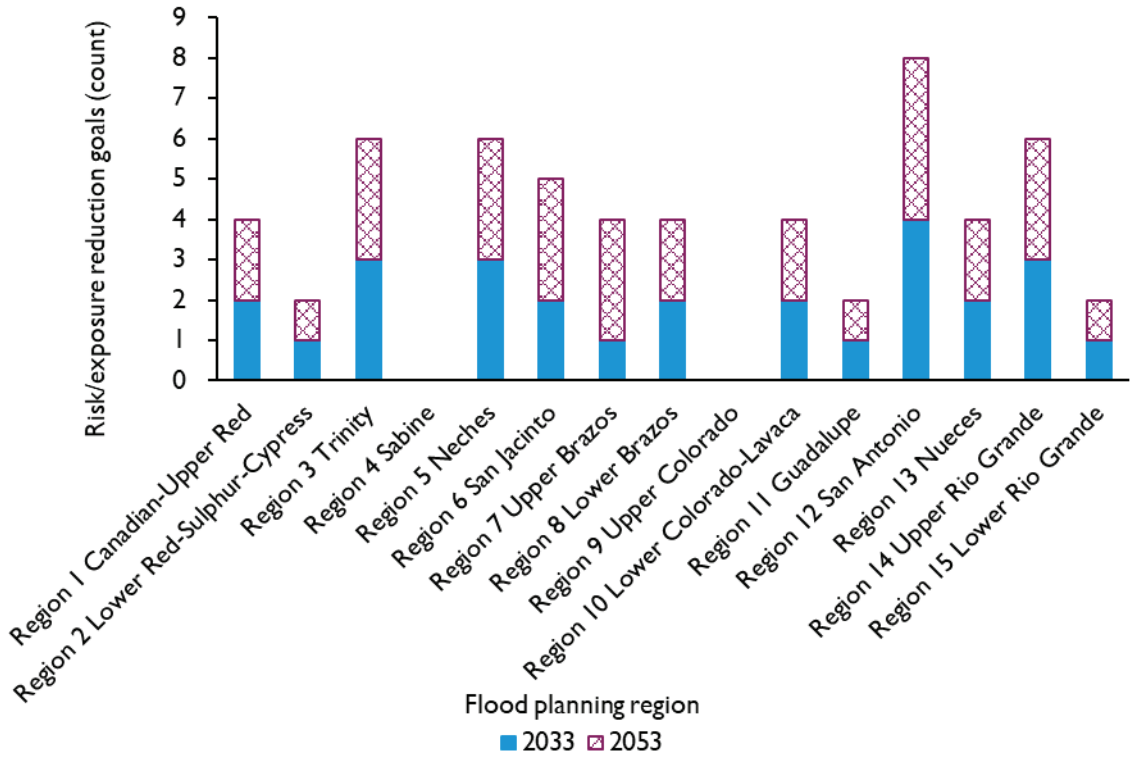


Table 6-2. Examples of goals related to reducing structures and population in the 1 percent (100-year) and 0.2 percent (500-year) annual chance floodplains (including structural improvements, land acquisition, and agricultural land)

Region	Goal	Term of goal	Target year
1	Reduce number of habitable structures within the 1 percent existing flood hazard layer by 20 percent.	Short term (10 year)	2033
5	An average of 25 percent of the new regional infrastructure projects between 2033 and 2053 will utilize larger storm events (>100-year) as the basis of their design.	Long term (30 year)	2053
6	Reduce the number of structures subject to inundation during the 100-year event by 25 percent by 2053.	Long term (30 year)	2053

6.3.3 Implementing flood risk reduction projects

Approximately 41 percent (142) of all goals relate to implementing flood risk reduction projects (Figure 6-4). This applies to implementing structural and non-structural projects, including construction and land acquisition (Table 6-3).

Figure 6-4. Goals related to implementing flood risk reduction projects (including acquisition and construction) by flood planning region

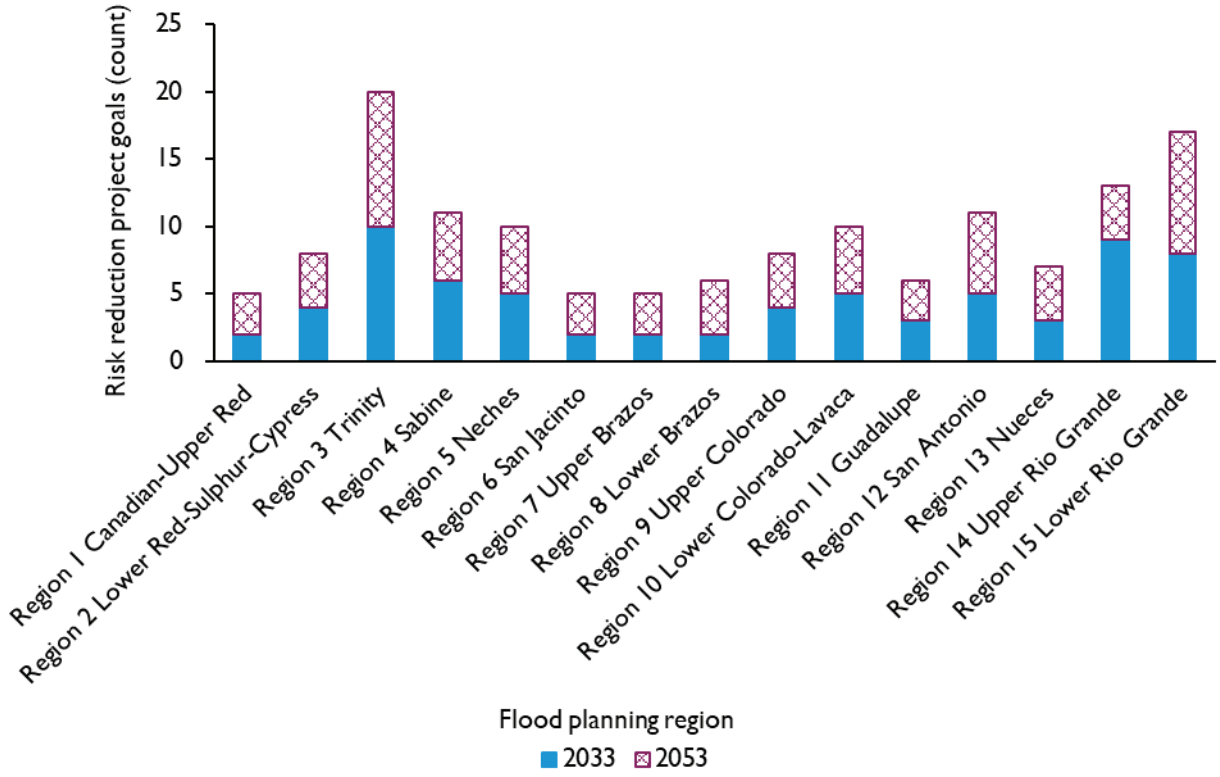


Table 6-3. Examples of goals related to implementing flood risk reduction projects (including acquisition and construction)

Region	Goal	Term of goal	Target year
3	Reduce the number of structures within the 1 percent floodplain by 10 percent (i.e. through structural projects, property buyouts, acquisitions, elevations, and/or relocations.)	Long term (30 year)	2053
4	Reduce exposure of existing structures in flood prone areas by elevating, acquiring, relocating, or otherwise providing flood protection to 10 percent of structures.	Short term (10 year)	2033

6.3.4 Stakeholder and public outreach, education, and training

Approximately 37 percent (129) of all goals relate to enhancing public outreach and stakeholder engagement (Figure 6-5). This includes efforts to increase public participation in the regional flood planning process, providing and promoting training opportunities, and efforts to promote regional and interjurisdictional coordination on flood planning (Table 6-4).

Figure 6-5. Stakeholder and public outreach, education, and training goals (including coordinated planning and response) by flood planning region

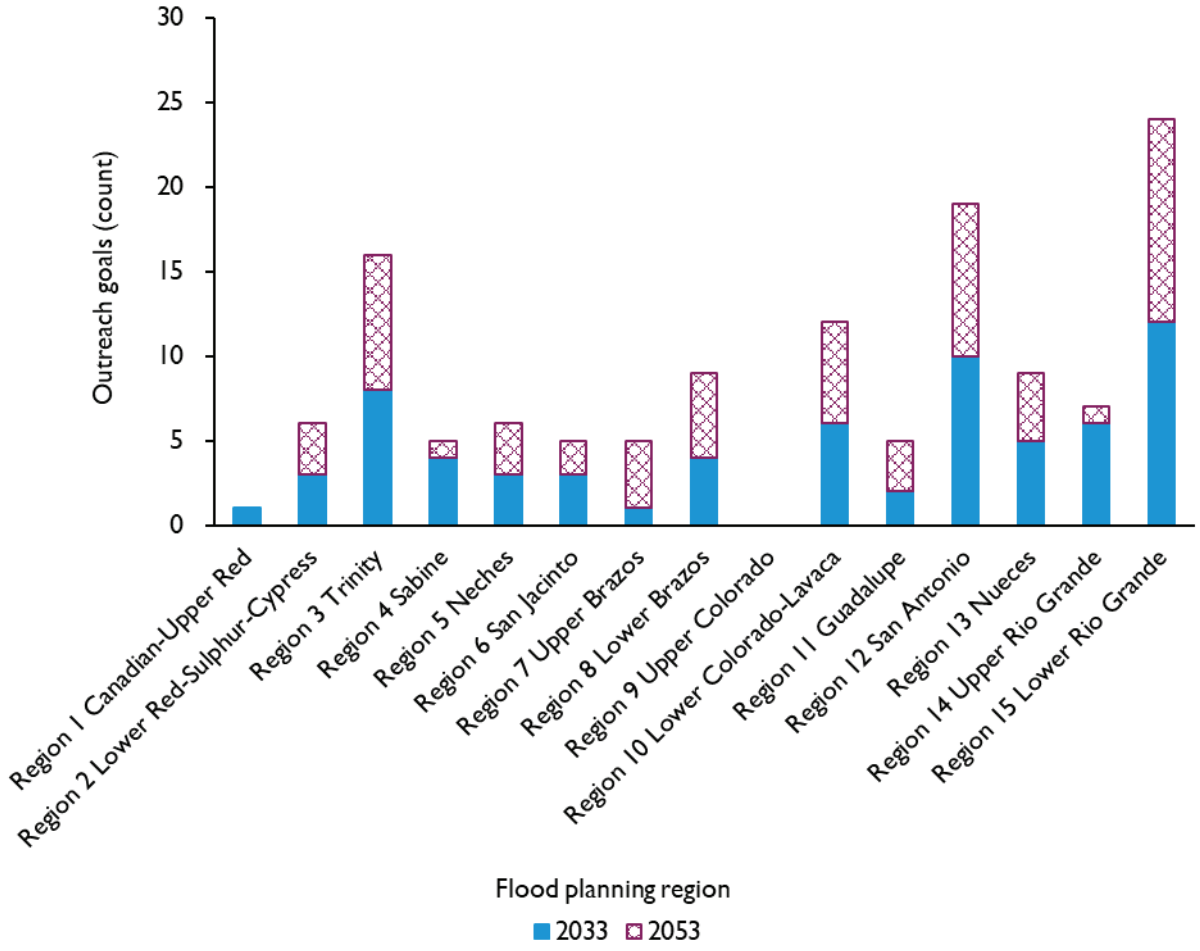


Table 6-4. Examples of goals related to stakeholder and public outreach, education, and training (including coordinated planning and response)

Region	Goal	Term of goal	Target year
2	For each planning cycle, hold three public outreach and education activities (in multiple locations within the region) to improve awareness of flood hazards and benefits of flood planning.	Short term (10 year)	2033
7	Encourage annual public outreach and education activities to improve awareness of flood hazards, flood planning, and projects associated with emergency response associated with flooding.	Long term (30 year)	2053
14	Establish community-led flood outreach and awareness programs (addressing risk, resiliency, and mitigation) in 90 percent of communities in the region.	Long term (30 year)	2053

6.3.5 Higher floodplain management standards/policies

Approximately 23 percent (79) of all goals seek to improve or increase the higher floodplain management standards adopted and implemented by communities (Figure 6-6). This includes efforts to increase National Flood Insurance Program participation and flood insurance policies, develop enhanced floodplain management and design standards applicable across a flood planning region and/or the state, and increase the utilization of best available data by communities (Table 6-5).

Figure 6-6. Goals related to higher floodplain management standards/policies (including National Flood Insurance Program participation, higher standards, flood insurance, design standards) by flood planning region

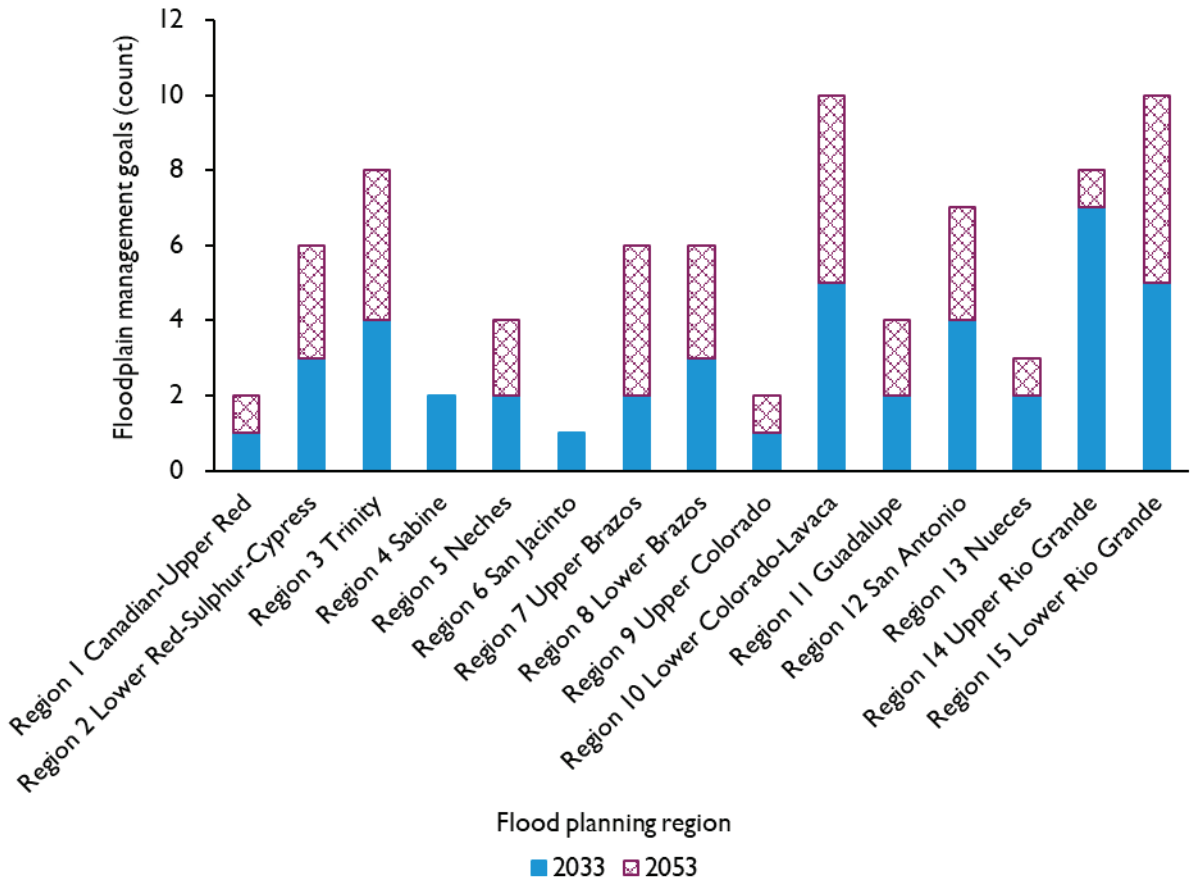


Table 6-5. Examples of goals related to higher floodplain management standards/ policies (including National Flood Insurance Program participation, higher standards, flood insurance, design standards)

Region	Goal	Term of goal	Target year
5	An average of 25 percent of the new regional infrastructure projects between 2033 and 2053 will utilize larger storm events (>100-year) as the basis of their design.	Long term (30 year)	2053
6	All flood regulatory authorities within the region will adopt standards equal to or exceeding minimums as recommended by the San Jacinto regional flood planning group in the first cycle of regional flood planning.	Short term (10 year)	2033
9	Increase to 90 percent of cities and 90 percent of counties with National Flood Insurance Program or equivalent standards	Short term (10 year)	2033

6.3.6 Roadway safety and early warning systems

Approximately 17 percent (61) of all goals seek to address flood risk related to roadways (Figure 6-7). This includes goals to improve safety at low water crossings, improve the level of service for exposed roadway segments, and increase the implementation of flood early warning systems for roadways and flood prone areas (Table 6-6).

Figure 6-7. Goals related to roadway safety and early warning systems (including low water crossings and other vulnerable roadways, signage, flood gauges, real-time reporting) by flood planning region

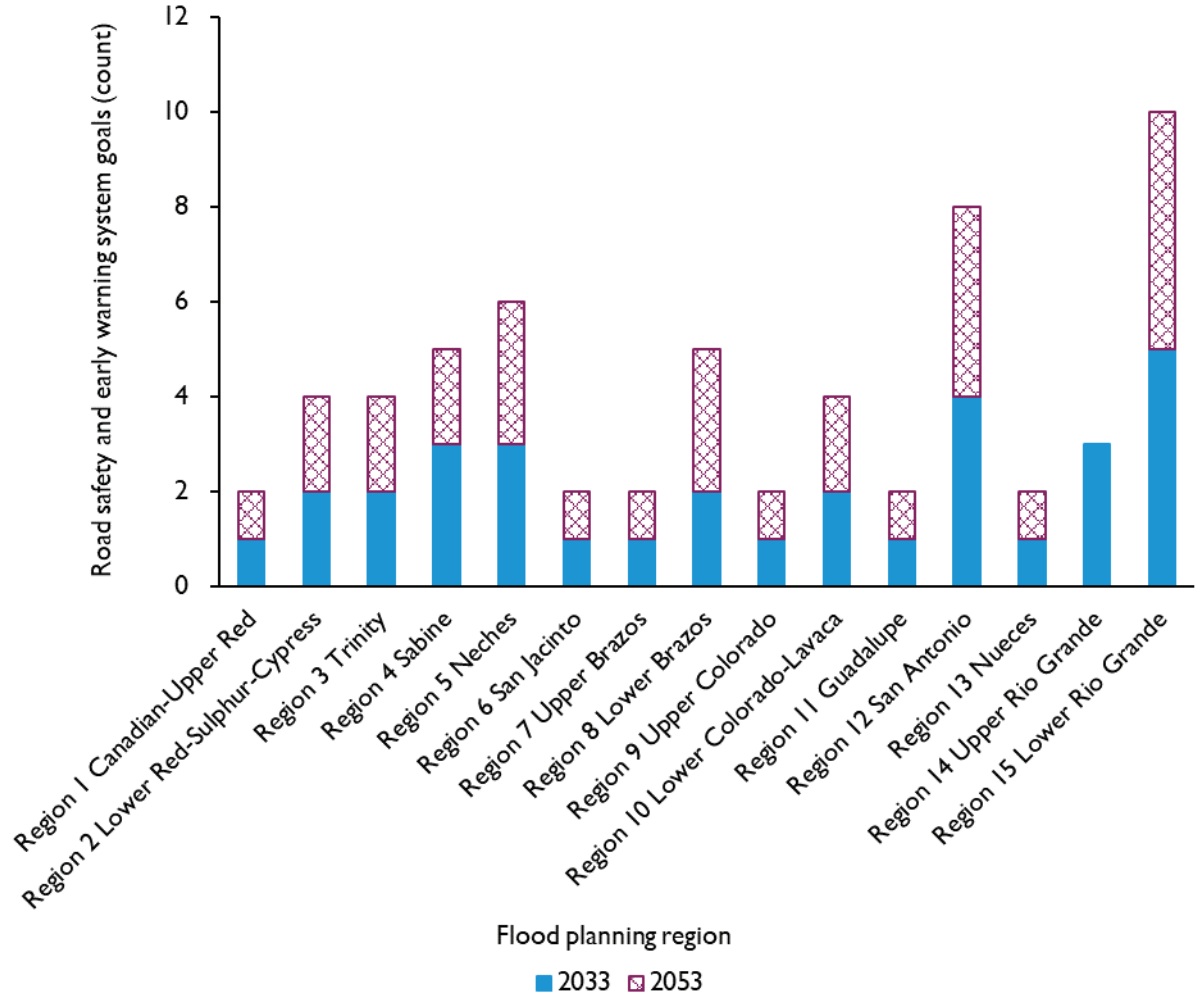


Table 6-6. Examples of goals related to roadway safety and early warning systems (including low water crossings and other vulnerable roadways, signage, flood gauges, real-time reporting)

Region	Goal	Term of goal	Target year
5	Give notice to 100 percent of affected units of local government and improve 50 percent of low water crossings identified in the latest regional flood plan by installing warning devices.	Short term (10 year)	2033
11	Improve safety beyond minimal signage at 90 percent of low water crossings through automatic flood gates and/or flood level passed.	Long term (30 year)	2053

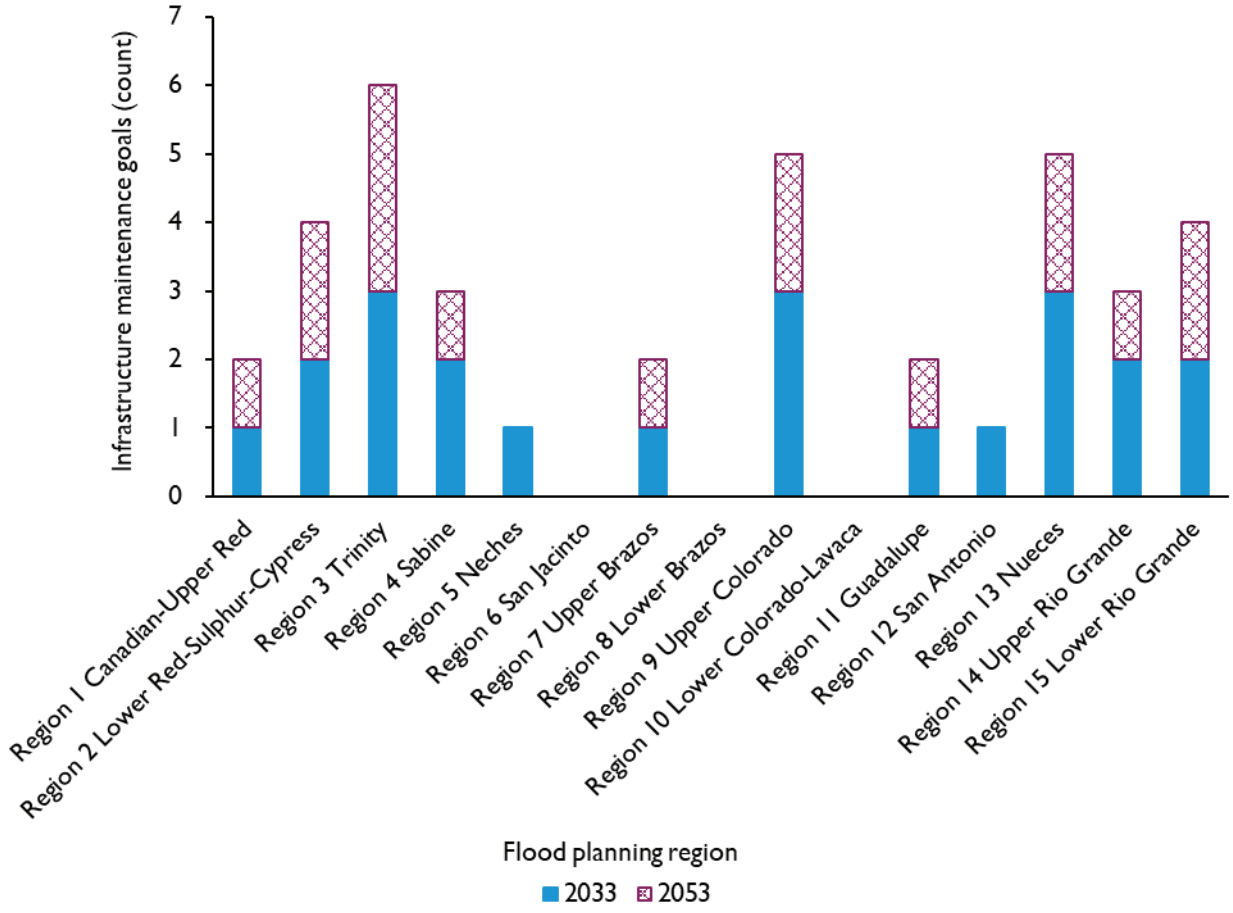
Of these 61 goals, approximately 20 percent (12) refer to flood gauges or technology related to monitoring rainfall, stream, and flood levels within the region (Table 6-7).

Table 6-7. Example of roadway safety and early warning system goals related to refer to flood gages or technology related to monitoring rainfall, stream, and flood levels

Region	Goal	Term of goal	Target year
4	Increase number of monitoring gauges and associated real-time reporting technology installed and maintained in the region to one in 50 percent of Hydraulic Unit Code 10s.	Short term (10 year)	2033
8	Perform an evaluation on the number of basins in the region and establish a baseline of where additional gauges (rainfall, stream, reservoir, etc.) are needed.	Short term (10 year)	2033
12	Increase the number of flood gauges (rainfall, stream, reservoir, etc.) in the region to provide localized information to emergency responders and storage and accessibility of data to agencies by 50 percent.	Long term (30 year)	2053

6.3.7 Infrastructure assessment, maintenance, and rehabilitation

Figure 6-8. Infrastructure assessment, maintenance, and rehabilitation goals (including dams and levees) by flood planning region



Approximately 11 percent (38) of all goals seek to repair, rehabilitate, or replace aging, deficient, and/or non-functional flood infrastructure (Figure 6-8). This includes goals to address high-hazard dams, unaccredited levees, low water crossings, and many other types of flood, stormwater, and drainage infrastructure (Table 6-8).

Table 6-8. Examples of goals related to infrastructure assessment, maintenance, and rehabilitation (including dams and levees)

Region	Goal	Term of goal	Target year
4	Increase number of monitoring gauges and associated real-time reporting technology installed and maintained in the region to one in 50 percent of Hydraulic Unit Code 10s.	Short term (10 year)	2033
8	Perform an evaluation on the number of basins in the region and establish a baseline of where additional gauges (rainfall, stream, reservoir, etc.) are needed.	Short term (10 year)	2033

6.3.8 Nature-based solutions, green infrastructure, and preservation

Approximately 9 percent (33) of all goals aim to increase the number of nature-based flood mitigation solutions, green flood infrastructure, and land implementing preservation, conservation, and/or restoration practices (Figure 6-9). These include goals for increased consideration of green and nature-based solutions when selecting flood infrastructure and mitigation projects and goals to increase the area of land naturally preserved, conserved, and/or restored for flood risk reduction and ecosystem co-benefits (Table 6-9).

Figure 6-9. Goals related to nature-based solutions, green infrastructure, and preservation by flood planning region

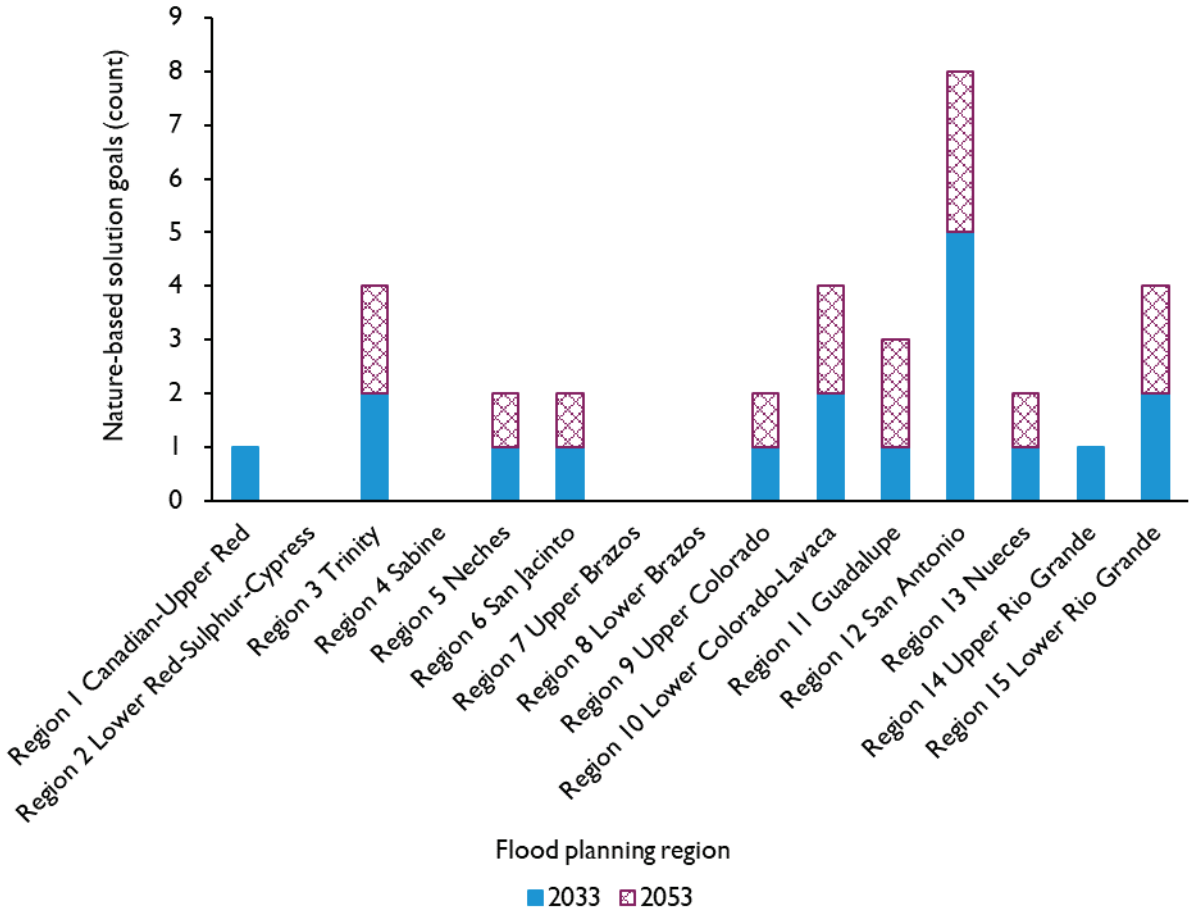


Table 6-9. Examples of goals related to nature-based solutions, green infrastructure, and preservation

Region	Goal	Term of goal	Target year
6	At least 90 percent of flood management strategies and flood mitigation projects identified within the regional floodplain will incorporate nature-based practices by 2053.	Long term (30 year)	2053
11	Consider and incorporate nature-based practices when acreage exceeds one acre (low-impact development, green infrastructure, natural channel design) in 50 percent of flood mitigation projects and strategies recommended in the regional flood plan.	Long term (30 year)	2053

6.3.9 Funding

Approximately 9 percent (31) of all goals seek to increase potential funding opportunities for flood mitigation and floodplain management (Figure 6-10). This includes identifying potential sources of state and federal funding for capital projects and studies and goals to increase the amount and number of communities with dedicated, continuous funding mechanisms, such as stormwater fees to support capital, operations, and maintenance costs (Table 6-10).

Figure 6-10. Funding goals (including identification of possible sources and locating dedicated sources) by flood planning region

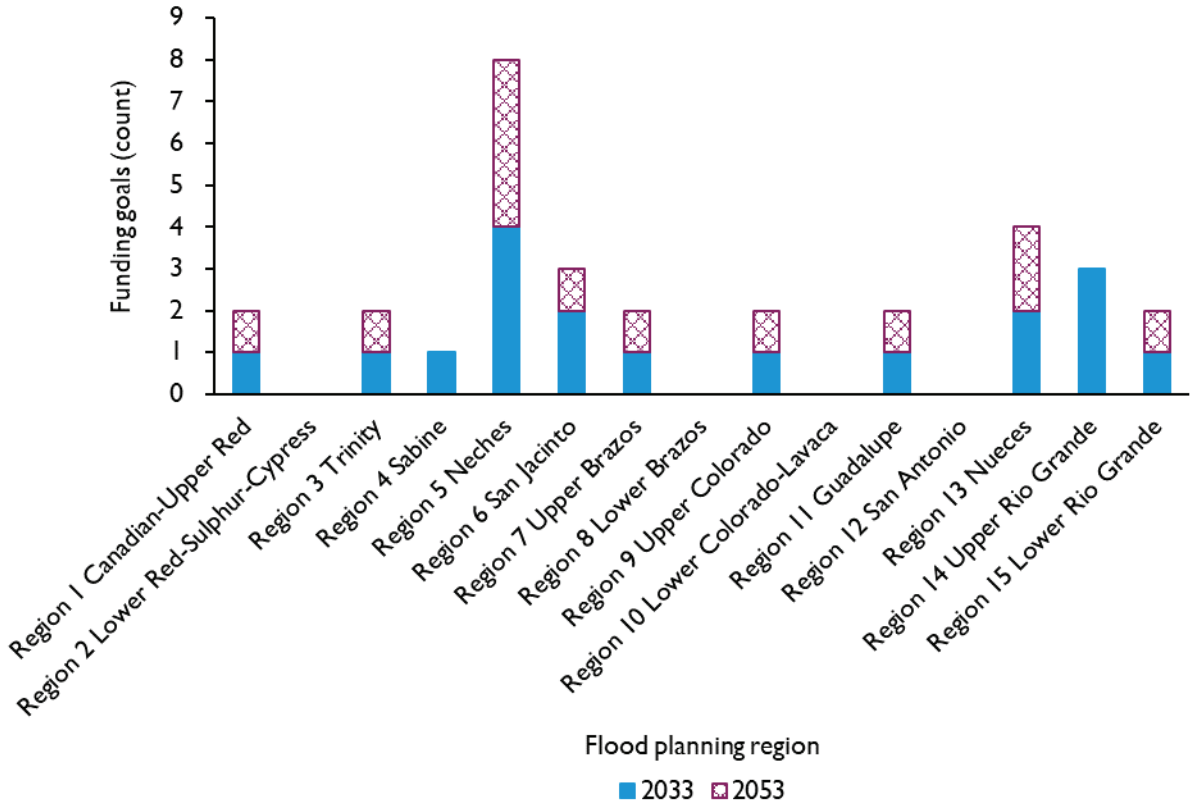


Table 6-10. Examples of goals related to funding (including identification of possible sources and locating dedicated sources)

Region	Goal	Term of goal	Target year
5	Seventy-five percent of the region's population is part of an entity that has a dedicated drainage charge, fee, or other continuous funding mechanism for the maintenance and/or restoration of flood infrastructure.	Long term (30 year)	2053
13	Dedicated funding sources, including state funding opportunities to support operations and management for 20 percent of the communities and 30 percent of the counties in Region 13.	Short term (10 year)	2033

6.3.10 Reducing flood risk to critical facilities

Approximately 4 percent (15) of all goals specifically called upon the active efforts to mitigate flood risk toward critical facilities (Figure 6-11). These include efforts to increase community access routes to critical facilities, reduce new critical facility construction in the 1 percent (100-year) annual chance hazard areas, and improve flood protection for critical facilities in flood prone areas (Table 6-11).

Figure 6-11. Goals to reduce flood risk to critical facilities by flood planning region

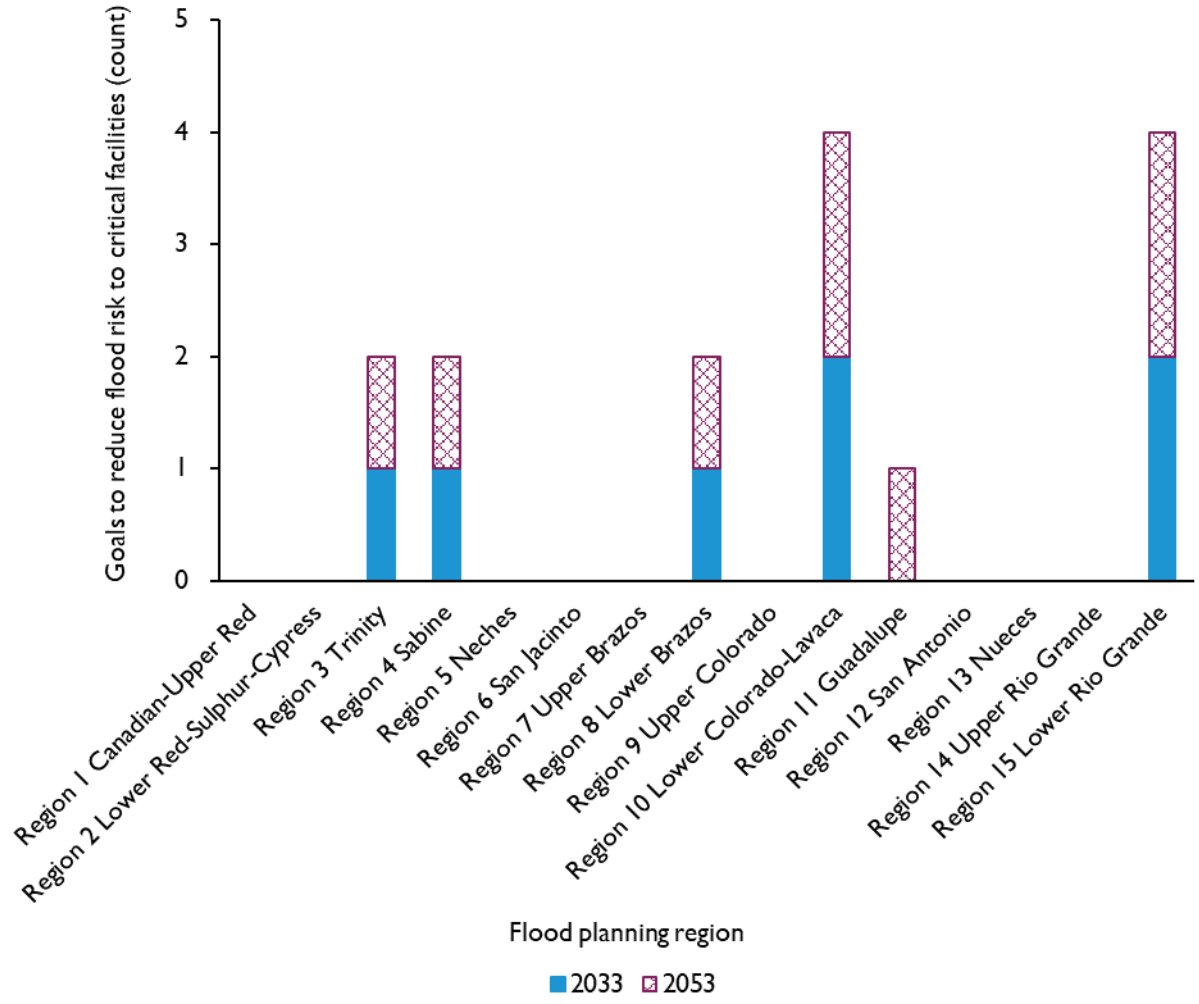


Table 6-11. Examples of goals related to reducing flood risk to critical facilities

Region	Goal	Term of goal	Target year
11	Reduce number of vulnerable buildings/structures/critical facilities within the 1percent existing flood hazard layer by 50 percent.	Long term (30 year)	2053
13	Reduce the number of critical facilities within the 1 percent floodplain.	Short term (10 year)	2033

Water supply

Approximately 1 percent (3) of all goals pursue opportunities for contributions to water supplies through elements of regional flood planning (Figure 6-12). These include efforts to establish dual-purpose regional storage facilities for flood mitigation and water supply and goals increasing the number of entities providing flood/stormwater detention that could be used for water reuse applications (Table 6-12).

Figure 6-12. Water supply goals by flood planning region

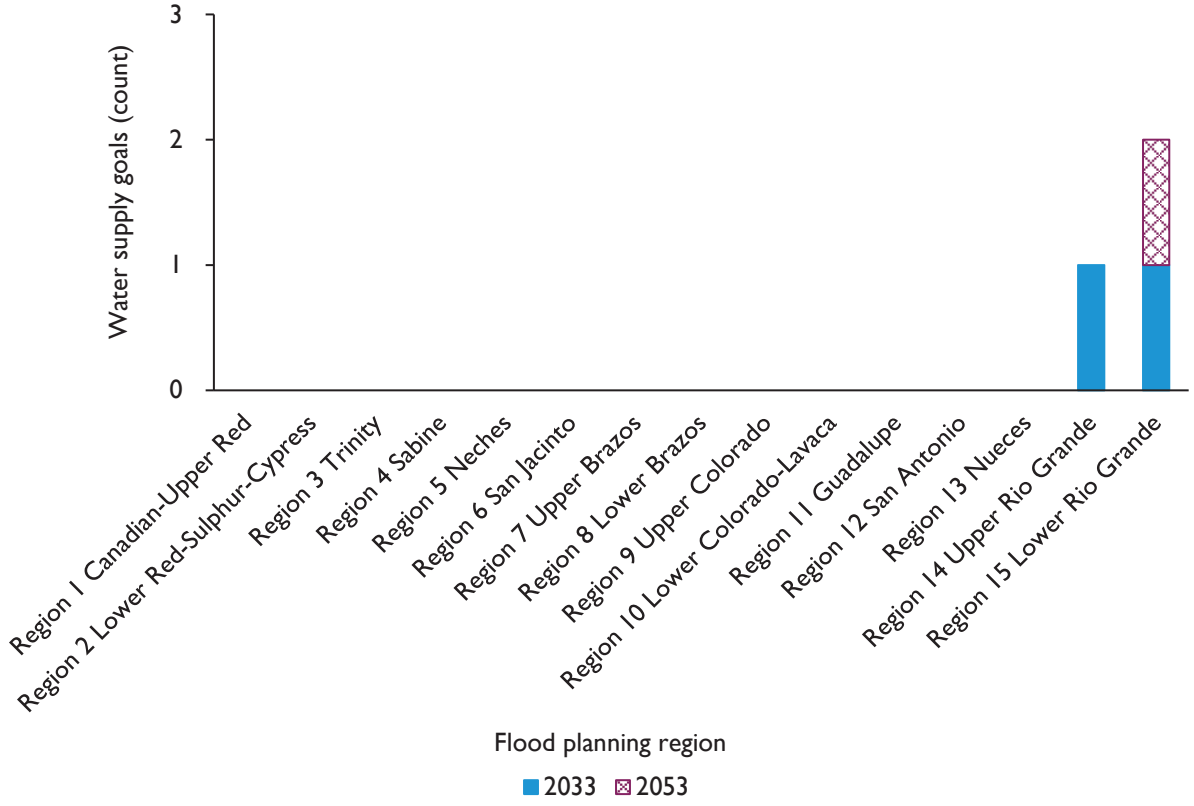


Table 6-12. Examples of goals related to water supply

Region	Goal	Term of goal	Target year
14	Establish dual usage regional storage facilities for flood mitigation and water supply.	Short term (10 year)	2033
15	Increase the number of entities that provide regional detention that could be used for water reuse applications or as part of their floodplain management program by over 60 percent.	Long term (30 year)	2053

6.3.11 Non-structural flood risk reduction

Approximately 18 percent (64) of all goals were related to pursuing opportunities for mitigating flood risk through non-structural approaches (Figure 6-13). These include efforts to establish flood early warning systems, flood gauges, and real-time reporting mechanisms (Table 6-13).

Figure 6-13. Non-structural flood risk mitigation goals by flood planning region

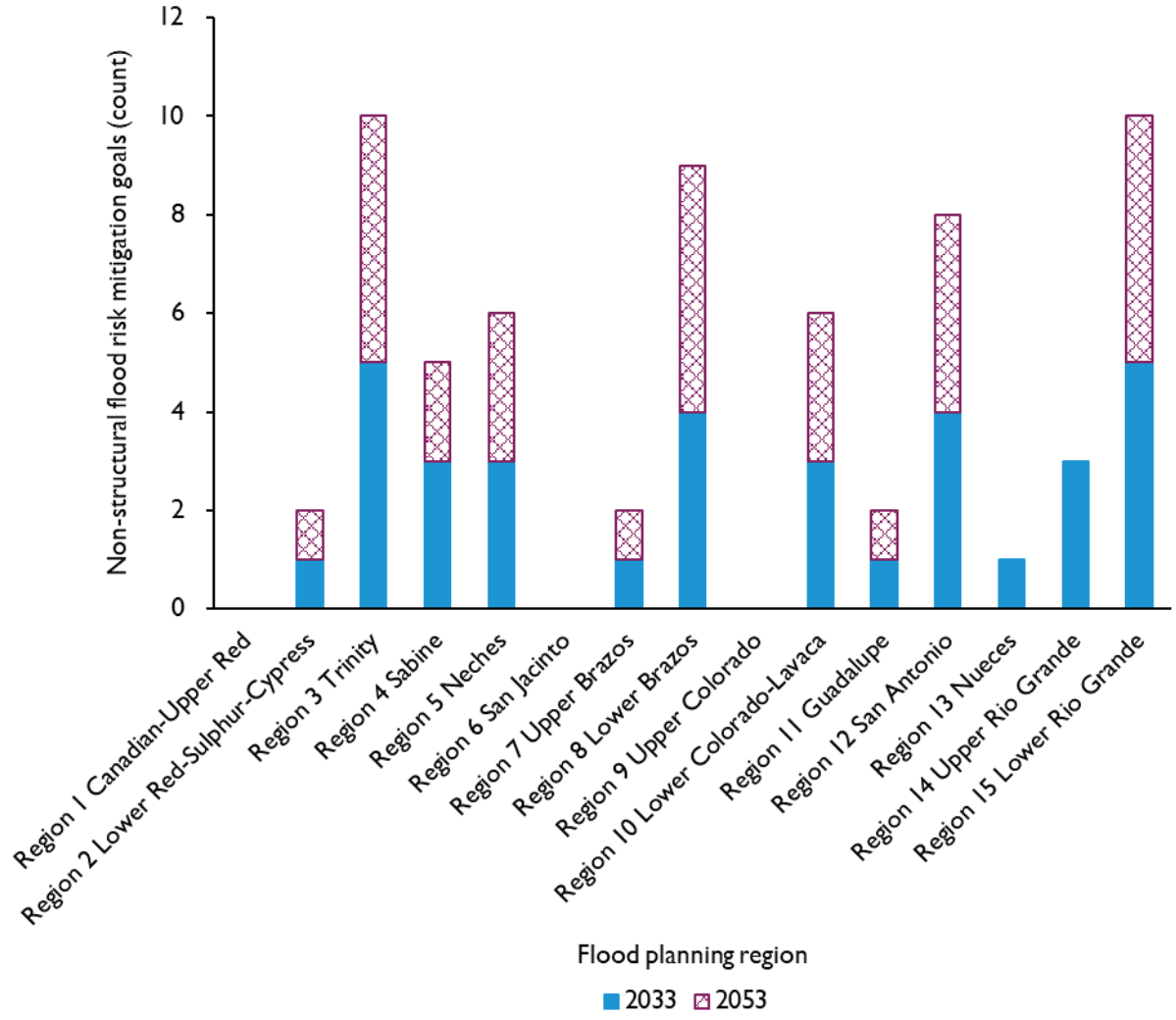


Table 6-13. Examples of goals related to non-structural flood risk mitigation

Region	Goal	Term of goal	Target year
13	Improve regional coordination, data collection/sharing of flood events and impacts, and implementation of flood warning systems.	Long term (30 year)	2053
15	Develop a regionally coordinated warning and emergency response program that can detect the flood threat and provide timely warning of impending flood danger to more than 70 percent of the most populated areas of the region.	Long term (30 year)	2053

6.3.12 Multiple themes

While an attempt was made to categorize goals into 12 themes based on the many similarities in regional flood planning group goals, the uniqueness of the regions and planning group membership led to many variations and perspectives (Table 6-14). Approximately 69 percent (242) of all regional flood planning goals belonged to more than one theme.

Table 6-14. Examples of goals that belonged to more than one theme

Region	Goal	Description	Term of goal	Target year
10	Increase the number of communities with warning and emergency response capabilities, or that participate in regional flood warning systems (e.g., Lower Colorado River Authority, Hydromet, City of Austin Early Warning System), that can detect flood threats in real time and provide timely warning of impending flood danger.	(1) Risk and exposure reduction in the 1 percent and 0.2 percent floodplains (including structural improvements, land acquisition, and agricultural land) (2) Stakeholder and public outreach, education, and training (including coordinated planning and response) (3) Roadway safety and early warning systems (low water crossings and other vulnerable roadways, signage, flood gauges, real-time reporting) (4) Non-structural flood risk reduction (flood early warning systems, flood gauges, real-time reporting)	Short term (10 year)	2033
15	Increase community access to critical facilities and evacuation routes during and after a flooding event by performing a study to establish a baseline.	(1) Risk reduction studies (including mapping, data collection, and project development), (2) Stakeholder and public outreach, education, and training (including coordinated planning and response), (3) Roadway safety and early warning systems (low water crossings and other vulnerable roadways, signage, flood gauges, real-time reporting), and (4) Reduce flood risk to critical facilities.	Short term (10 year)	2033

The most prevalent theme, representing approximately 41 percent (142) of all goals, is to implement flood risk reduction projects. The least prevalent theme of the goals is water supply, accounting for approximately 1 percent (3). We can extrapolate meaning from these quantities to understand that regional flood planning groups may choose to connect more with the public and other stakeholders in future cycles to increase participation in the planning process. Planning groups have fewer goals for water supply, as the conceptualization of dual-purpose retention basins will require more studies and environmental evaluation to become a practical and achievable goal.

6.4 Residual risk

It is important to note that even with the achievement of flood risk reduction goals, it is not possible to protect against all potential flood risks. To conceptualize this limitation, the term "residual risk" is used. Residual risk refers to the risk that remains after efforts have been made to reduce the risk or impact of a hazard. Planning groups were asked to recognize and clearly state the levels of residual risk that will

remain in the region, even after the stated flood mitigation goals are fully met. For example, if a regional goal was to reduce the miles of major roadways subject to flooding during a serious rain event (1 percent chance of happening any given year), the residual risks could include flooding risks associated with amounts of rain that exceed the 1 percent (100-year) annual chance event or new risks, such as levee failure. More specific descriptions of residual risk are available in Chapter 8.

6.5 Future cycles

A task is included in the standard regional flood planning group scope of work to analyze the progress made toward each goal since the previous planning cycle. This will include a general description of how the new regional flood plan differs from the previous plan, including the status of achieving the goals. The first assessment will occur during the 2023–2028 cycle of regional flood planning. Planning groups will assess progress for each goal, identifying obstacles that may be impeding progress. Making necessary adjustments by the end of the second cycle is crucial as environmental and regulatory circumstances can change over time, and goals that were once relevant and achievable may become outdated or unattainable. Re-evaluating their goals allows planning groups to adapt to the changing circumstances and make adjustments to ensure the full plan aligns with the overarching goal of protecting life and property from flood damage. The experience gained by the regional flood planning groups during the first cycle of regional flood planning will help them improve upon their goals in future cycles.

References

USGS (United States Geologic Survey), n.d., Hydrologic Unit Codes (HUCs) explained, nas.er.usgs.gov/hucs.aspx