Range of Potential Implementation Actions

METHODS AND IMPLEMENTATION ACTIONS[1,2]			
METHODS	**IMPLEMENTATION ACTIONS**	**EXAMPLES**	**DESCRIPTION OF IMPLEMENTATION ACTIONS**
MANAGE SALT DISCHARGES TO LSJR TO MATCH ASSIMILATIVE CAPACITY	**1. Controlled Timing of Salinity Discharges (Real Time Management Program)****		Would take advantage of assimilative capacity in the river to export salt to the Delta and ocean. Requires a coordinated program to manage discharges, diversions, and river and tributary releases to enable timed releases of drainage. Also requires real-time monitoring of flow and EC at selected sites, real-time data QA and a means of information sharing and dissemination. **Since RTM is an "umbrella" concept that includes a number of other implementation actions, this and the other actions are bolded within the table so that it is clear that they are related.**
REDUCE SALT AND BORON LOADING TO THE LSJR (LOAD REDUCTION)	2. Reduce Point Sources of Salts	a. Self Regenerating Water Softener Ban or Restrictions**	Would reduce salt loads from POTWs that have self regenerating water softeners in their service areas
		b. New or Improved (less saline) Surface Water Supply**	Would reduce salt loads from POTWs that can substitute new surface water supplies for existing groundwater supplies
		c. Ind/Food Processing Source Control (and/or Pretreatment)**	Would reduce salt loads from POTWs by requiring industrial control of salts in discharges to sewer system. For specific industries discharging to land, source reductions may potentially benefit the LSJR through reduced salt loadings via groundwater accretion. Includes,but is not limited to, product substitution, process modification, and solids removal.
		d. Desalination of POTW Effluent	Would reduce salt loads to the river from POTWs through installation of desalination facilities. Requires brine handling/disposal.
	3. Reduce Nonpoint Sources of Salts	a. Reduce application of salts contained in fertilizers and soil amendments	Would reduce salt loads through high efficiency irrigation, improved fertilizer management, or other measures aimed at reduced application of chemicals containing salt.
	4. Evaporation Ponds (lined)	**a. Evaporation Ponds**	Would reduce loads by capturing all or portion of drainage flows and diverting to evaporation ponds. Requires brine or salt handling/disposal.
		b. Solar Evaporators	Alternative means to further evaporate drainage water (from evaporation or recirculation practices) for harvesting or disposal of salt.
		c. Salt Energy Ponds	Alternative means to further evaporate drainage water (from evaporation or recirculation practices) and generate energy during the course of the natural evaporation of water.
	5. Water Treatment (drainage or supply)**	a. Satellite or regional treatment facilities	Would reduce salt loads through installation of desalination facilities. Requires brine handling/disposal.
	6. Land Retirement**	a. Retired lands as Reuse Facilities	Would reduce salt loads associated with drainage and also functions to retain salt by accepting recycled water, along with its salt load. Regional reuse could include active alternative land management or use of lands for drainage, treatment and disposal, etc.
		b. Retire lands to non-irrigated uses	Would reduce salt loads by reduction in applied water and associated drainage. Lands could be converted to commercial, industrial purposes, flood control, habitat purposes, etc.
		c. Temporary Land Retirement (Fallowing)	Would reduce salt loads by reduction in applied water and associated drainage. The decision to fallow land would be made at the beginning of a season. Fallowing could be seasonal or could continue for longer durations.
	7. Water Supply Improvement	a. Delta Corridors Plan	Would reduce salt loads into the LSJR by eliminating the recirculation of SJR water back into the Delta Mendota Canal. Irrigation with lower saline DMC water would result in lower concentrations of salinity in the drainage water discharged from the west side of the basin.
		b. Bay Delta Conservation Plan	Would reduce salt loads by importing less saline water into the Delta Mendota Canal for irrigation of land on the west side of the basin, ultimately resulting in lower concentrations of salinity in the drainage water.
	8. Water Conservation	a. Replace Infrastructure (pipelines to replace canals)**	Would conserve water by reducing seepage to reduce diversion of tributary flows. Reduction in salt loading would be depend on whether water conserved would be applied to other land in the basin. If not re-applied, conservation would result in reduction in salt loading. If re-applied, net reduction in loading would be minimal. Incidental benefits of seepage (groundwater recharge and canal-dependent vegetation) will be lost.
		b. Optimize existing irrigation efficiency	Similar to 8(a). Note that irrigation systems are being updated at a rapid pace, primarily because the production benefits of drip and microspray systems on certain crops have proven to be very significant, and the cost of the systems has come down. While the total salt load is the same, salts are precipitated and retained near the root zone, so the total salt load to the aquifer is episodic, occurring during periods of infrequent seasonal flushing.
		c. Agricultural Water Reduction and Reuse**	Would reduce the amount of water used in agricultural activities. Involves waer audits, land retirement, IFDM, and evaporation ponds.
	9. High-efficiency irrigation systems, per se	a. Increase retention of soluble salts	Would reduce loading through reduction in drainage volume. Conventional notions of leaching excess salt through the soil to maintain production change somewhat with drip and microspray irrigation, in which salts may accumulate harmlessly beyond the soil zone accessed by plants to uptake water.
	10. Sequential Reuse & volume Reduction (Salt sensitive crops & solar evap)**	**a. Integrated Farm Drainage Management (IFDM)**	Would reduce the volume discharged; results in an increase in concentration. Relies on eventual salt export to an alternative sink. Reuse occurs on dedicated facilities with attendant costs. Feasibility would be enhanced by a reliable market for the recovered salt products.
		b. Salt accumulation area	Would reduce the volume discharged from the Grasslands Drainage Area (GDA). Grow salt tolernat crops, install tile drains and collection systems, solar evap or treatment of drainage water and disposal at Kettleman Hills landfill or a possible in-basin salt sink.
	11. Active Alternative Land Mgmt (sequential reuse/crop selection etc.)		Would reduce the volume discharged. A blend of 10 and 12b, mainly distinguished by the intentional nature of land management through crop selection and irrigation practices, without creating a dedicated facility.
	12. Drainage Water Recirculation	**a. Tailwater Recovery**	Would reduce loadings through reuse and volume reduction. Where reuse replaces irrigation with imported water, would reduce salt load associated with that supply. This practice relies on ultimate salt disposal for long term sustainability.
		b. Tilewater Recovery - Re-route drainage water	Similar to 12a., but entails recirculation of greater salt concentration from the outset.**(Grasslands Bypass)**
	13. Reduce Impact of Groundwater as a Source of Salinity to LSJR		General category which may include: (a) reduction in shallow groundwater levels to reduce subsurface drainage (and salt) loading into subsurface drain systems (areas where this is hydrogeologically feasible may be fairly limited) and (b) reduction in groundwater as water supply or reduction in salt loadings in groundwater though well-head treatment.
MANAGE SALT LOADS VIA SEQUESTRATION/TRANSPORT/ DISPOSAL	14. Salt Disposal/Out of Basin Transport (Supports Actions #2-6 that create a brine)**	a. Brine Line to Ocean	Alternative means of salt transport and out-of-basin disposal
		b. Truck to WWTP with ocean outfall	Similar to 14a.
		c. Landfill disposal	Alternative means of in-basin or out-of-basin disposal of crystallized salt
		d. Out of Basin Salt Sink	Similar to 14c.
		e. Commercial market for reclaimed salt	Alternative means of out-of-basin disposal of salt.
		f. Direct Well Injection	Alternative means of In-basin disposal of concentrated salts or brines
		g. Brine line to WWTP with ocean outfall	Similar to 14.a
ADAPTIVE WATER SUPPLY MANAGEMEN T	**15. SJR water diversions during periods of excess SJR flows**		Would take advantage of excess flows in SJR during wet years or wet seasons to provide irrigators with low salinity water to better manage salts (i.e., following periods of high salinity due to drought or other factors, to better control the leaching process, to alternate with irrigation using higher salinity water , etc.)

[1] While the table focuses on 'salt', the implementation actions described will be similar for boron, and other ions.

[2] The implementation actions represent a range of potential actions for consideration during the development of three alternative management scenarios. Each alternative management scenario will likely be a combination of several implementation actions, and it should be noted that some of the actions listed (i.e. Salinity Real Time Management Program, Active Alternative Land Management, etc.) by definition already involve a combination of actions (many of which are listed above).

Proposed LOW Salinity Management Scenario

METHODS AND IMPLEMENTATION ACTIONS[1,2]			DESCRIPTION OF IMPLEMENTATION ACTIONS
METHODS	IMPLEMENTATION ACTIONS	EXAMPLES	
MANAGE SALT DISCHARGES TO LSJR TO MATCH ASSIMILATIVE CAPACITY	**1. Controlled Timing of Salinity Discharges (Real Time Management Program)****		Would take advantage of assimilative capacity in the river to export salt to the Delta and ocean. Requires a coordinated program to manage discharges, diversions, and river and tributary releases to enable timed releases of drainage. Also requires real-time monitoring of flow and EC at selected sites, real-time data QA and a means of information sharing and dissemination. **Since RTM is an "umbrella" concept that includes a number of other implementation actions, this and the other actions are bolded within the table so that it is clear that they are related.**
REDUCE SALT AND BORON LOADING TO THE LSJR (LOAD REDUCTION)	2. Reduce Point Sources of Salts	a. Self Regenerating Water Softener Ban or Restrictions**	Would reduce salt loads from POTWs that have self regenerating water softeners in their service areas
		b. New or Improved (less saline) Surface Water Supply**	Would reduce salt loads from POTWs that can substitute new surface water supplies for existing groundwater supplies
		c. Ind/Food Processing Source Control (and/or Pretreatment)**	Would reduce salt loads from POTWs by requiring industrial control of salts in discharges to sewer system. For specific industries discharging to land, source reductions may potentially benefit the LSJR through reduced salt loadings via groundwater accretion. Includes,but is not limited to, product substitution, process modification, and solids removal.
		d. Desalination of POTW Effluent	Would reduce salt loads to the river from POTWs through installation of desalination facilities. Requires brine handling/disposal.
	3. Reduce Nonpoint Sources of Salts	a. Reduce application of salts contained in fertilizers and soil amendments	Would reduce salt loads through high efficiency irrigation, improved fertilizer management, or other measures aimed at reduced application of chemicals containing salt.
	4. Evaporation Ponds (lined)	**a. Evaporation Ponds**	Would reduce loads by capturing all or portion of drainage flows and diverting to evaporation ponds. Requires brine or salt handling/disposal.
		b. Solar Evaporators	Alternative means to further evaporate drainage water (from evaporation or recirculation practices) for harvesting or disposal of salt.
		c. Salt Energy Ponds	Alternative means to further evaporate drainage water (from evaporation or recirculation practices) and generate energy during the course of the natural evaporation of water.
	5. Water Treatment (drainage or supply)**	a. Satellite or regional treatment facilities	Would reduce salt loads through installation of desalination facilities. Requires brine handling/disposal.
	6. Land Retirement**	a. Retired lands as Reuse Facilities	Would reduce salt loads associated with drainage and also functions to retain salt by accepting recycled water, along with its salt load. Regional reuse could include active alternative land management or use of lands for drainage, treatment and disposal, etc.
		b. Retire lands to non-irrigated uses	Would reduce salt loads by reduction in applied water and associated drainage. Lands could be converted to commercial, industrial purposes, flood control, habitat purposes, etc.
		c. Temporary Land Retirement (Fallowing)	Would reduce salt loads by reduction in applied water and associated drainage. The decision to fallow land would be made at the beginning of a season. Fallowing could be seasonal or could continue for longer durations.
	7. Water Supply Improvement	a. Delta Corridors Plan	Would reduce salt loads into the LSJR by eliminating the recirculation of SJR water back into the Delta Mendota Canal. Irrigation with lower saline DMC water would result in lower concentrations of salinity in the drainage water discharged from the west side of the basin.
		b. Bay Delta Conservation Plan	Would reduce salt loads by importing less saline water into the Delta Mendota Canal for irrigation of land on the west side of the basin, ultimately resulting in lower concentrations of salinity in the drainage water.
	8. Water Conservation	a. Replace Infrastructure (pipelines to replace canals)**	Would conserve water by reducing seepage to reduce diversion of tributary flows. Reduction in salt loading would be depend on whether water conserved would be applied to other land in the basin. If not re-applied, conservation would result in reduction in salt loading. If re-applied, net reduction in loading would be minimal. Incidental benefits of seepage (groundwater recharge and canal-dependent vegetation) will be lost.
		b. Optimize existing irrigation efficiency	Similar to 8(a). Note that irrigation systems are being updated at a rapid pace, primarily because the production benefits of drip and microspray systems on certain crops have proven to be very significant, and the cost of the systems has come down. While the total salt load is the same, salts are precipitated and retained near the root zone, so the total salt load to the aquifer is episodic, occurring during periods of infrequent seasonal flushing.
		c. Agricultural Water Reduction and Reuse**	Would reduce the amount of water used in agricultural activities. Involves waer audits, land retirement, IFDM, and evaporation ponds.
	9. High-efficiency irrigation systems, per se	a. Increase retention of soluble salts	Would reduce loading through reduction in drainage volume. Conventional notions of leaching excess salt through the soil to maintain production change somewhat with drip and microspray irrigation, in which salts may accumulate harmlessly beyond the soil zone accessed by plants to uptake water.
	10. Sequential Reuse & volume Reduction (Salt sensitive crops & solar evap)**	**a. Integrated Farm Drainage Management (IFDM)**	Would reduce the volume discharged; results in an increase in concentration. Relies on eventual salt export to an alternative sink. Reuse occurs on dedicated facilities with attendant costs. Feasibility would be enhanced by a reliable market for the recovered salt products.
		b. Salt accumulation area	Would reduce the volume discharged from the Grasslands Drainage Area (GDA). Grow salt tolernat crops, install tile drains and collection systems, solar evap or treatment of drainage water and disposal at Kettleman Hills landfill or a possible in-basin salt sink.
	11. Active Alternative Land Mgmt (sequential reuse/crop selection etc.)		Would reduce the volume discharged. A blend of 10 and 12b, mainly distinguished by the intentional nature of land management through crop selection and irrigation practices, without creating a dedicated facility.
	12. Drainage Water Recirculation	**a. Tailwater Recovery**	Would reduce loadings through reuse and volume reduction. Where reuse replaces irrigation with imported water, would reduce salt load associated with that supply. This practice relies on ultimate salt disposal for long term sustainability.
		b. Tilewater Recovery - Re-route drainage water	Similar to 12a., but entails recirculation of greater salt concentration from the outset. **(Grasslands Bypass)**
	13. Reduce Impact of Groundwater as a Source of Salinity to LSJR		General category which may include: (a) reduction in shallow groundwater levels to reduce subsurface drainage (and salt) loading into subsurface drain systems (areas where this is hydrogeologically feasible may be fairly limited) and (b) reduction in groundwater as water supply or reduction in salt loadings in groundwater though well-head treatment.
MANAGE SALT LOADS VIA SEQUESTRATION/TRANSPORT/ DISPOSAL	14. Salt Disposal/Out of Basin Transport (Supports Actions #2-6 that create a brine)**	a. Brine Line to Ocean	Alternative means of salt transport and out-of-basin disposal
		b. Truck to WWTP with ocean outfall	Similar to 14a.
		c. Landfill disposal	Alternative means of in-basin or out-of-basin disposal of crystallized salt
		d. Out of Basin Salt Sink	Similar to 14c.
		e. Commercial market for reclaimed salt	Alternative means of out-of-basin disposal of salt.
		f. Direct Well Injection	Alternative means of In-basin disposal of concentrated salts or brines
		g. Brine line to WWTP with ocean outfall	Similar to 14.a
ADAPTIVE WATER SUPPLY MANAGEMENT	**15. SJR water diversions during periods of excess SJR flows**		Would take advantage of excess flows in SJR during wet years or wet seasons to provide irrigators with low salinity water to better manage salts (i.e., following periods of high salinity due to drought or other factors, to better control the leaching process, to alternate with irrigation using higher salinity water , etc.)

[1] While the table focuses on 'salt', the implementation actions described will be similar for boron, and other ions.

[2] The implementation actions represent a range of potential actions for consideration during the development of three alternative management scenarios. Each alternative management scenario will likely be a combination of several implementation actions, and it should be noted that some of the actions listed (i.e. Salinity Real Time Management Program, Active Alternative Land Management, etc.) by definition already involve a combination of actions (many of which are listed above).

Proposed MEDIUM Salinity Management Scenario

METHODS AND IMPLEMENTATION ACTIONS[1,2]			
METHODS	**IMPLEMENTATION ACTIONS**	**EXAMPLES**	**DESCRIPTION OF IMPLEMENTATION ACTIONS**
MANAGE SALT DISCHARGES TO LSJR TO MATCH ASSIMILATIVE CAPACITY	**1. Controlled Timing of Salinity Discharges (Real Time Management Program)****		Would take advantage of assimilative capacity in the river to export salt to the Delta and ocean. Requires a coordinated program to manage discharges, diversions, and river and tributary releases to enable timed releases of drainage. Also requires real-time monitoring of flow and EC at selected sites, real-time data QA and a means of information sharing and dissemination. **Since RTM is an "umbrella" concept that includes a number of other implementation actions, this and the other actions are bolded within the table so that it is clear that they are related.**
REDUCE SALT AND BORON LOADING TO THE LSJR (LOAD REDUCTION)	2. Reduce Point Sources of Salts	a. Self Regenerating Water Softener Ban or Restrictions**	Would reduce salt loads from POTWs that have self regenerating water softeners in their service areas
		b. New or Improved (less saline) Surface Water Supply**	Would reduce salt loads from POTWs that can substitute new surface water supplies for existing groundwater supplies
		c. Ind/Food Processing Source Control (and/or Pretreatment)**	Would reduce salt loads from POTWs by requiring industrial control of salts in discharges to sewer system. For specific industries discharging to land, source reductions may potentially benefit the LSJR through reduced salt loadings via groundwater accretion. Includes,but is not limited to, product substitution, process modification, and solids removal.
		d. Desalination of POTW Effluent	Would reduce salt loads to the river from POTWs through installation of desalination facilities. Requires brine handling/disposal.
	3. Reduce Nonpoint Sources of Salts	a. Reduce application of salts contained in fertilizers and soil amendments	Would reduce salt loads through high efficiency irrigation, improved fertilizer management, or other measures aimed at reduced application of chemicals containing salt.
	4. Evaporation Ponds (lined)	**a. Evaporation Ponds**	Would reduce loads by capturing all or portion of drainage flows and diverting to evaporation ponds. Requires brine or salt handling/disposal.
		b. Solar Evaporators	Alternative means to further evaporate drainage water (from evaporation or recirculation practices) for harvesting or disposal of salt.
		c. Salt Energy Ponds	Alternative means to further evaporate drainage water (from evaporation or recirculation practices) and generate energy during the course of the natural evaporation of water.
	5. Water Treatment (drainage or supply)**	a. Satellite or regional treatment facilities	Would reduce salt loads through installation of desalination facilities. Requires brine handling/disposal.
	6. Land Retirement**	a. Retired lands as Reuse Facilities	Would reduce salt loads associated with drainage and also functions to retain salt by accepting recycled water, along with its salt load. Regional reuse could include active alternative land management or use of lands for drainage, treatment and disposal, etc.
		b. Retire lands to non-irrigated uses	Would reduce salt loads by reduction in applied water and associated drainage. Lands could be converted to commercial, industrial purposes, flood control, habitat purposes, etc.
		c. Temporary Land Retirement (Fallowing)	Would reduce salt loads by reduction in applied water and associated drainage. The decision to fallow land would be made at the beginning of a season. Fallowing could be seasonal or could continue for longer durations.
	7. Water Supply Improvement	a. Delta Corridors Plan	Would reduce salt loads into the LSJR by eliminating the recirculation of SJR water back into the Delta Mendota Canal. Irrigation with lower saline DMC water would result in lower concentrations of salinity in the drainage water discharged from the west side of the basin.
		b. Bay Delta Conservation Plan	Would reduce salt loads by importing less saline water into the Delta Mendota Canal for irrigation of land on the west side of the basin, ultimately resulting in lower concentrations of salinity in the drainage water.
	8. Water Conservation	a. Replace Infrastructure (pipelines to replace canals)**	Would conserve water by reducing seepage to reduce diversion of tributary flows. Reduction in salt loading would be depend on whether water conserved would be applied to other land in the basin. If not re-applied, conservation would result in reduction in salt loading. If re-applied, net reduction in loading would be minimal. Incidental benefits of seepage (groundwater recharge and canal-dependent vegetation) will be lost.
		b. Optimize existing irrigation efficiency	Similar to 8(a). Note that irrigation systems are being updated at a rapid pace, primarily because the production benefits of drip and microspray systems on certain crops have proven to be very significant, and the cost of the systems has come down. While the total salt load is the same, salts are precipitated and retained near the root zone, so the total salt load to the aquifer is episodic, occurring during periods of infrequent seasonal flushing.
		c. Agricultural Water Reduction and Reuse**	Would reduce the amount of water used in agricultural activities. Involves waer audits, land retirement, IFDM, and evaporation ponds.
	9. High-efficiency irrigation systems, per se	a. Increase retention of soluble salts	Would reduce loading through reduction in drainage volume. Conventional notions of leaching excess salt through the soil to maintain production change somewhat with drip and microspray irrigation, in which salts may accumulate harmlessly beyond the soil zone accessed by plants to uptake water.
	10. Sequential Reuse & volume Reduction (Salt sensitive crops & solar evap)**	**a. Integrated Farm Drainage Management (IFDM)**	Would reduce the volume discharged; results in an increase in concentration. Relies on eventual salt export to an alternative sink. Reuse occurs on dedicated facilities with attendant costs. Feasibility would be enhanced by a reliable market for the recovered salt products.
		b. Salt accumulation area	Would reduce the volume discharged from the Grasslands Drainage Area (GDA). Grow salt tolernat crops, install tile drains and collection systems, solar evap or treatment of drainage water and disposal at Kettleman Hills landfill or a possible in-basin salt sink.
	11. Active Alternative Land Mgmt (sequential reuse/crop selection etc.)		Would reduce the volume discharged. A blend of 10 and 12b, mainly distinguished by the intentional nature of land management through crop selection and irrigation practices, without creating a dedicated facility.
	12. Drainage Water Recirculation	**a. Tailwater Recovery**	Would reduce loadings through reuse and volume reduction. Where reuse replaces irrigation with imported water, would reduce salt load associated with that supply. This practice relies on ultimate salt disposal for long term sustainability.
		b. Tilewater Recovery - Re-route drainage water	Similar to 12a., but entails recirculation of greater salt concentration from the outset. **(Grasslands Bypass)**
	13. Reduce Impact of Groundwater as a Source of Salinity to LSJR		General category which may include: (a) reduction in shallow groundwater levels to reduce subsurface drainage (and salt) loading into subsurface drain systems (areas where this is hydrogeologically feasible may be fairly limited) and (b) reduction in groundwater as water supply or reduction in salt loadings in groundwater though well-head treatment.
MANAGE SALT LOADS VIA SEQUESTRATION/TRANSPORT/ DISPOSAL	14. Salt Disposal/Out of Basin Transport (Supports Actions #2-6 that create a brine)**	a. Brine Line to Ocean	Alternative means of salt transport and out-of-basin disposal
		b. Truck to WWTP with ocean outfall	Similar to 14a.
		c. Landfill disposal	Alternative means of in-basin or out-of-basin disposal of crystallized salt
		d. Out of Basin Salt Sink	Similar to 14c.
		e. Commercial market for reclaimed salt	Alternative means of out-of-basin disposal of salt.
		f. Direct Well Injection	Alternative means of In-basin disposal of concentrated salts or brines
		g. Brine line to WWTP with ocean outfall	Similar to 14.a
ADAPTIVE WATER SUPPLY MANAGEMENT	**15. SJR water diversions during periods of excess SJR flows**		Would take advantage of excess flows in SJR during wet years or wet seasons to provide irrigators with low salinity water to better manage salts (i.e., following periods of high salinity due to drought or other factors, to better control the leaching process, to alternate with irrigation using higher salinity water , etc.)

[1] While the table focuses on 'salt', the implementation actions described will be similar for boron, and other ions.

[2] The implementation actions represent a range of potential actions for consideration during the development of three alternative management scenarios. Each alternative management scenario will likely be a combination of several implementation actions, and it should be noted that some of the actions listed (i.e. Salinity Real Time Management Program, Active Alternative Land Management, etc.) by definition already involve a combination of actions (many of which are listed above).

Proposed HIGH Salinity Management Scenario

METHODS	IMPLEMENTATION ACTIONS	EXAMPLES	DESCRIPTION OF IMPLEMENTATION ACTIONS
METHODS AND IMPLEMENTATION ACTIONS[1,2]			
MANAGE SALT DISCHARGES TO LSJR TO MATCH ASSIMILATIVE CAPACITY	**1. Controlled Timing of Salinity Discharges (Real Time Management Program)****		Would take advantage of assimilative capacity in the river to export salt to the Delta and ocean. Requires a coordinated program to manage discharges, diversions, and river and tributary releases to enable timed releases of drainage. Also requires real-time monitoring of flow and EC at selected sites, real-time data QA and a means of information sharing and dissemination. **Since RTM is an "umbrella" concept that includes a number of other implementation actions, this and the other actions are bolded within the table so that it is clear that they are related.**
REDUCE SALT AND BORON LOADING TO THE LSJR (LOAD REDUCTION)	2. Reduce Point Sources of Salts	a. Self Regenerating Water Softener Ban or Restrictions**	Would reduce salt loads from POTWs that have self regenerating water softeners in their service areas
		b. New or Improved (less saline) Surface Water Supply**	Would reduce salt loads from POTWs that can substitute new surface water supplies for existing groundwater supplies
		c. Ind/Food Processing Source Control (and/or Pretreatment)**	Would reduce salt loads from POTWs by requiring industrial control of salts in discharges to sewer system. For specific industries discharging to land, source reductions may potentially benefit the LSJR through reduced salt loadings via groundwater accretion. Includes,but is not limited to, product substitution, process modification, and solids removal.
		d. Desalination of POTW Effluent	Would reduce salt loads to the river from POTWs through installation of desalination facilities. Requires brine handling/disposal.
	3. Reduce Nonpoint Sources of Salts	a. Reduce application of salts contained in fertilizers and soil amendments	Would reduce salt loads through high efficiency irrigation, improved fertilizer management, or other measures aimed at reduced application of chemicals containing salt.
	4. Evaporation Ponds (lined)	**a. Evaporation Ponds**	Would reduce loads by capturing all or portion of drainage flows and diverting to evaporation ponds. Requires brine or salt handling/disposal.
		b. Solar Evaporators	Alternative means to further evaporate drainage water (from evaporation or recirculation practices) for harvesting or disposal of salt.
		c. Salt Energy Ponds	Alternative means to further evaporate drainage water (from evaporation or recirculation practices) and generate energy during the course of the natural evaporation of water.
	5. Water Treatment (drainage or supply)**	a. Satellite or regional treatment facilities	Would reduce salt loads through installation of desalination facilities. Requires brine handling/disposal.
	6. Land Retirement**	a. Retired lands as Reuse Facilities	Would reduce salt loads associated with drainage and also functions to retain salt by accepting recycled water, along with its salt load. Regional reuse could include active alternative land management or use of lands for drainage, treatment and disposal, etc.
		b. Retire lands to non-irrigated uses	Would reduce salt loads by reduction in applied water and associated drainage. Lands could be converted to commercial, industrial purposes, flood control, habitat purposes, etc.
		c. Temporary Land Retirement (Fallowing)	Would reduce salt loads by reduction in applied water and associated drainage. The decision to fallow land would be made at the beginning of a season. Fallowing could be seasonal or could continue for longer durations.
	7. Water Supply Improvement	a. Delta Corridors Plan	Would reduce salt loads into the LSJR by eliminating the recirculation of SJR water back into the Delta Mendota Canal. Irrigation with lower saline DMC water would result in lower concentrations of salinity in the drainage water discharged from the west side of the basin.
		b. Bay Delta Conservation Plan	Would reduce salt loads by importing less saline water into the Delta Mendota Canal for irrigation of land on the west side of the basin, ultimately resulting in lower concentrations of salinity in the drainage water.
	8. Water Conservation	a. Replace Infrastructure (pipelines to replace canals)**	Would conserve water by reducing seepage to reduce diversion of tributary flows. Reduction in salt loading would be depend on whether water conserved would be applied to other land in the basin. If not re-applied, conservation would result in reduction in salt loading. If re-applied, net reduction in loading would be minimal. Incidental benefits of seepage (groundwater recharge and canal-dependent vegetation) will be lost.
		b. Optimize existing irrigation efficiency	Similar to 8(a). Note that irrigation systems are being updated at a rapid pace, primarily because the production benefits of drip and microspray systems on certain crops have proven to be very significant, and the cost of the systems has come down. While the total salt load is the same, salts are precipitated and retained near the root zone, so the total salt load to the aquifer is episodic, occurring during periods of infrequent seasonal flushing.
		c. Agricultural Water Reduction and Reuse**	Would reduce the amount of water used in agricultural activities. Involves waer audits, land retirement, IFDM, and evaporation ponds.
	9. High-efficiency irrigation systems, per se	a. Increase retention of soluble salts	Would reduce loading through reduction in drainage volume. Conventional notions of leaching excess salt through the soil to maintain production change somewhat with drip and microspray irrigation, in which salts may accumulate harmlessly beyond the soil zone accessed by plants to uptake water.
	10. Sequential Reuse & volume Reduction (Salt sensitive crops & solar evap)**	**a. Integrated Farm Drainage Management (IFDM)**	Would reduce the volume discharged; results in an increase in concentration. Relies on eventual salt export to an alternative sink. Reuse occurs on dedicated facilities with attendant costs. Feasibility would be enhanced by a reliable market for the recovered salt products.
		b. Salt accumulation area	Would reduce the volume discharged from the Grasslands Drainage Area (GDA). Grow salt tolernat crops, install tile drains and collection systems, solar evap or treatment of drainage water and disposal at Kettleman Hills landfill or a possible in-basin salt sink.
	11. Active Alternative Land Mgmt (sequential reuse/crop selection etc.)		Would reduce the volume discharged. A blend of 10 and 12b, mainly distinguished by the intentional nature of land management through crop selection and irrigation practices, without creating a dedicated facility.
	12. Drainage Water Recirculation	**a. Tailwater Recovery**	Would reduce loadings through reuse and volume reduction. Where reuse replaces irrigation with imported water, would reduce salt load associated with that supply. This practice relies on ultimate salt disposal for long term sustainability.
		b. Tilewater Recovery - Re-route drainage water	Similar to 12a., but entails recirculation of greater salt concentration from the outset. **(Grasslands Bypass)**
	13. Reduce Impact of Groundwater as a Source of Salinity to LSJR		General category which may include: (a) reduction in shallow groundwater levels to reduce subsurface drainage (and salt) loading into subsurface drain systems (areas where this is hydrogeologically feasible may be fairly limited) and (b) reduction in groundwater as water supply or reduction in salt loadings in groundwater though well-head treatment.
MANAGE SALT LOADS VIA SEQUESTRATION/TRANSPORT/ DISPOSAL	14. Salt Disposal/Out of Basin Transport (Supports Actions #2-6 that create a brine)**	a. Brine Line to Ocean	Alternative means of salt transport and out-of-basin disposal
		b. Truck to WWTP with ocean outfall	Similar to 14a.
		c. Landfill disposal	Alternative means of in-basin or out-of-basin disposal of crystallized salt
		d. Out of Basin Salt Sink	Similar to 14c.
		e. Commercial market for reclaimed salt	Alternative means of out-of-basin disposal of salt.
		f. Direct Well Injection	Alternative means of In-basin disposal of concentrated salts or brines
		g. Brine line to WWTP with ocean outfall	Similar to 14.a
ADAPTIVE WATER SUPPLY MANAGEMENT	**15. SJR water diversions during periods of excess SJR flows**		Would take advantage of excess flows in SJR during wet years or wet seasons to provide irrigators with low salinity water to better manage salts (i.e., following periods of high salinity due to drought or other factors, to better control the leaching process, to alternate with irrigation using higher salinity water , etc.)

[1] While the table focuses on 'salt', the implementation actions described will be similar for boron, and other ions.

[2] The implementation actions represent a range of potential actions for consideration during the development of three alternative management scenarios. Each alternative management scenario will likely be a combination of several implementation actions, and it should be noted that some of the actions listed (i.e. Salinity Real Time Management Program, Active Alternative Land Management, etc.) by definition already involve a combination of actions (many of which are listed above).